Vol. 1115 Number 1

OFFICIAL GAZETTE

of the UNITED STATES PATENT AND TRADEMARK OFFICE

Route to:

1790 ***Celebrating 200 Years of Creativity*** 1990

PATENTS

June 5, 1990

U.S. DEPARTMENT OF COMMERCE

Patent and Trademark Office

PUBLISHED WEEKLY BY AUTHORITY OF CONGRESS

OFFICIAL GAZETTE of the
UNITED STATES PATENT AND TRADEMARK OFFICE

June 5, 1990 Volume 1115 Number 1

CONTENTS

	Page
Patent and Trademark Office Notices	
Patent Cooperation Treaty (PCT) Information	1115 OG 2
Notice of Maintenance Fees Payable	1115 OG 2
Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees	1115 OG 3
Notification of Acceptance of Delayed Payment of Maintenance Fee	1115 OG 5
Reissue Applications Filed	1115 OG 5
Requests for Reexaminations Filed	1115 OG 5
Errata	1115 OG 5
Notice of Suspension	1115 OG 6
Service by Publication	1115 OG 6
Decision on Petition	1115 OG 6
Patent Certificates of Correction	1115 OG 7
Special Boxes for Mail	1115 OG 8
Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries	1115 OG 9
Condition of Patent Applications	1115 OG 11
Reexaminations	1
Statutory Inventory Registrations	3
Reissue Patents Granted (33,226)	7
Plant Patents Granted (7,240)	9
Patents Granted	
General and Mechanical (4,930,161)	11
Chemical (4,931,061)	317
Electrical (4,931,597)	473
Design Patents Granted (308,280)	639
Index of Patentees	PI 1
Indices of Reissue, Reexamination, Design, Plant Patentees and Statutory Invention Registrations	PI 81
Classification of	
Patents (Including Reissues, and Reexaminations)	PI 83
Designs, and Plants Applications	PI 87
Geographical Index of Residence of Inventors	
Patents (Including Reissues and Reexaminations)	PI 88
Designs and Plant Applications	PI 90
Change of Address Form and Subscription Order Form	Back Page

The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed.

THE OFFICIAL GAZETTE (PATENT SECTION), issued weekly.
THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly.
GENERAL INFORMATION concerning PATENTS.
GENERAL INFORMATION concerning TRADEMARKS.

COPIES OF PATENTS are furnished by the Patent and Trademark Office at $1.50 each; PLANT PATENTS in color, $10.00 each; copies of TRADEMARKS at $1.50 each. Address orders to the Commissioner of Patents and Trademarks, Washington, D.C., 20231.

Printing authorized by Section 11(a)3 of Title 35, U.S. P.T.O.

PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1109 O.G. 3 on Dec. 5, 1989.

For use of the European Patent Office as an International Searching Authority for international applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

For use of the European Patent Office as an International Preliminary Examining Authority for international applications filed in the United States Receiving Office, see the notices appearing in the *Official Gazette* at 1080 O.G. 2 on July 7, 1987 and at 1091 O.G. 2 on June 7, 1988.

The search fee of the European Patent Office was changed due to a difference in the exchange rate of the U.S. dollar in relation to the German Mark as of March 1, 1990, and was announced in the *Official Gazette* at 1111 O.G. 24 on Feb. 20, 1990.

International PCT fees were changed on June 1, 1989 due to a difference in the exchange rate of the U.S. dollar in relaton to the Swiss Franc and were announced in the *Official Gazette* at 1102 O.G. 90 on May 30, 1989.

Certain domestic PCT fees and charges for International Search and Preliminary Examination have been changed effective Apr. 17, 1989 and were announced in the *Official Gazette* at 1100 O.G. 24 on Mar. 7, 1989.

The current schedule of PCT fees (in U.S. dollars) is as follows:

Transmittal fee:	170.00
Search Fee	
U.S. Patent and Trademark Office (USPTO) as International Searching Authority (ISA)	
—No corresponding prior U.S. national application filed	550.00
—Corresponding prior U.S. national application filed	380.00
—Supplemental search fee, per additional invention	150.00
European Patent Office as ISA	1242.00
Preliminary examination fee	
USPTO as International Preliminary Examining Authority (IPEA)	
—Search fee paid to USPTO as ISA.	400.00
—Additional examination fee, per additional invention	130.00
—ISA not the USPTO	600.00
—Additional examination fee, per additional invention	200.00
International fees	
Basic fee	436.00
Basic Supplemental fee (for each page over 30)	9.00
Designation fee per country or region for the first 10 national or regional offices	106.00
Designation fee for 11th and subsequent designations	No Charge
Handling fee	134.00

U.S. National Stage fees

	Small Entity	Regular
USPTO was IPEA	165.00	330.00
USPTO was ISA but not IPEA	185.00	370.00
USPTO was neither ISA nor IPEA	250.00	500.00
USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(2) to (4)	25.00	50.00
—For each independent claim in excess of 3	18.00	36.00
—For each claim in excess of 20	6.00	12.00
—For each application containing a multiple dependent claim	60.00	120.00
—Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39(1)	60.00	120.00
—Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39(1)	30.00	30.00

Apr. 30, 1990

HARRY F. MANBECK, Jr.
Assistant Secretary and Commissioner of Patents and Trademarks.

Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on application filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Apr. 17, 1989. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the patent.

Attention is drawn to the patents which were issued on June 2, 1987 for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,669,125 through 4,670,906
Reissue Patents based on the above identified patents.

Attention is drawn to the patents which were issued on May 31, 1983 for which maintenance fees due at 7 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,385,403 through 4,386,436
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months and seven years and six months are set forth in 37 CFR 1.20(e), (f), (h) and (i), as amended effective Apr. 17, 1989, which are reproduced below:

37 CFR § 1.20 Post-issuance fees

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after after Dec. 12, 1980 and before Aug. 27, 1982, in force

beyond 4 years; the fee is due by three years and six months after the original grant.....$245.00

"(f) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant.....$495.00"

"(h) For maintaining an original or reissue patent except a design or plant patent, based on an application filed on or after Aug. 27,1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§1.9(f)).....$245.00
By other than a small entity.....$490.00"

"(i) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant:

By a small entity (§1.9(f)).....$495.00
By other than a small enttity.....$990.00"

The amounts of the surcharges as amended effective Apr. 17, 1989, are set forth in 37 CFR 1.20 (k), (l) and (m) which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months , seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27,1982.....$120.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity(§1.9(f)).....$60.00
By other than a small entity.....$120.00"

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay is shown to the satisfaction of the Commissioner to have been unavoidable.....$550.00"

Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

PATENTS WHICH EXPIRED MARCH 25, 1990
DUE TO FAILURE TO PAY MAINTENANCE FEES

Patent Number	Serial Number	Issue Date
Re. 32,981	07/137,993	7/11/89
(4,577,653)	(06/509,302)	(3/25/86)
4,320,603	06/221,526	3/23/82
4,320,618	06/245,383	3/23/82
4,320,631	06/227,846	3/23/82
4,320,749	06/218,617	3/23/82
4,320,757	06/248,260	3/23/82
4,320,794	06/254,107	3/23/82
4,320,885	06/238,808	3/23/82
4,320,892	06/220,899	3/23/82
4,321,042	06/235,401	3/23/82
4,321,052	06/255,351	3/23/82
4,321,055	06/222,923	3/23/82
4,321,096	06/217,086	3/23/82
4,321,138	06/230,498	3/23/82
4,321,318	06/219,769	3/23/82
4,321,369	06/226,133	3/23/82
4,321,416	06/216,726	3/23/82
4,321,495	06/246,607	3/23/82
4,577,349	06/737,832	3/25/86
4,577,355	06/636,850	3/25/86
4,577,358	06/760,495	3/25/86
4,577,383	06/606,934	3/25/86
4,577,413	06/660,456	3/25/86
4,577,418	06/555,493	3/25/86
4,577,425	06/561,952	3/25/86
4,577,426	06/684,761	3/25/86
4,577,434	06/712,845	3/25/86
4,577,436	06/449,676	3/25/86
4,577,438	06/639,729	3/25/86
4,577,442	06/514,547	3/25/86
4,577,446	06/587,462	3/25/86
4,577,448	06/384,743	3/25/86
4,577,451	06/612,833	3/25/86
4,577,457	06/587,609	3/25/86
4,577,463	06/664,665	3/25/86
4,577,464	06/590,963	3/25/86
4,577,468	06/688,727	3/25/86
4,577,469	06/623,766	3/25/86
4,577,476	06/636,451	3/25/86
4,577,477	06/549,415	3/25/86
4,577,487	06/681,605	3/25/86
4,577,488	06/663,563	3/25/86
4,577,490	06/647,547	3/25/86
4,577,491	06/666,651	3/25/86
4,577,499	06/595,502	3/25/86
4,577,506	06/617,544	3/25/86
4,577,513	06/547,899	3/25/86
4,577,519	06/505,345	3/25/86
4,577,521	06/620,014	3/25/86
4,577,541	06/739,738	3/25/86
4,577,553	06/529,118	3/25/86
4,577,563	06/629,902	3/25/86
4,577,564	06/692,388	3/25/86
4,577,568	06/664,520	3/25/86
4,577,569	06/533,942	3/25/86
4,577,570	06/647,619	3/25/86
4,577,577	06/610,642	3/25/86
4,577,584	06/685,491	3/25/86
4,577,585	06/602,765	3/25/86
4,577,588	06/644,910	3/25/86
4,577,589	06/673,559	3/25/86
4,577,590	06/661,752	3/25/86
4,577,591	06/691,204	3/25/86
4,577,592	06/625,242	3/25/86
4,577,593	06/669,478	3/25/86
4,577,595	06/632,323	3/25/86
4,577,608	06/635,240	3/25/86
4,577,610	06/648,666	3/25/86
4,577,614	06/490,555	3/25/86
4,577,615	06/685,711	3/25/86
4,577,616	06/679,644	3/25/86
4,577,620	06/705,153	3/25/86
4,577,621	06/677,558	3/25/86
4,577,622	06/630,159	3/25/86
4,577,624	06/621,258	3/25/86
4,577,625	06/600,555	3/25/86
4,577,627	06/564,551	3/25/86
4,577,628	06/704,740	3/25/86
4,577,635	06/564,164	3/25/86
4,577,638	06/625,811	3/25/86
4,577,644	06/362,409	3/25/86
4,577,654	06/742,683	3/25/86
4,577,658	06/626,322	3/25/86
4,577,665	06/539,966	3/25/86
4,577,666	06/601,701	3/25/86
4,577,667	06/650,098	3/25/86
4,577,668	06/523,695	3/25/86
4,577,692	06/707,914	3/25/86

Patent Number	Serial Number	Issue Date
4,577,698	06/572,677	3/25/86
4,577,699	06/589,201	3/25/86
4,577,702	06/717,497	3/25/86
4,577,711	06/614,110	3/25/86
4,577,713	06/577,957	3/25/86
4,577,717	06/378,699	3/25/86
4,577,723	06/289,564	3/25/86
4,577,725	06/610,955	3/25/86
4,577,731	06/685,606	3/25/86
4,577,740	06/504,397	3/25/86
4,577,749	06/625,059	3/25/86
4,577,753	06/654,894	3/25/86
4,577,754	06/573,151	3/25/86
4,577,756	06/604,169	3/25/86
4,577,760	06/650,505	3/25/86
4,577,764	06/629,168	3/25/86
4,577,771	06/693,129	3/25/86
4,577,772	06/697,515	3/25/86
4,577,778	06/730,057	3/25/86
4,577,781	06/549,775	3/25/86
4,577,786	06/630,645	3/25/86
4,577,787	06/608,706	3/25/86
4,577,788	06/653,568	3/25/86
4,577,796	06/658,992	3/25/86
4,577,807	06/736,424	3/25/86
4,577,809	06/706,197	3/25/86
4,577,810	06/652,177	3/25/86
4,577,820	06/630,602	3/25/86
4,577,823	06/630,780	3/25/86
4,577,834	06/704,915	3/25/86
4,577,836	06/620,739	3/25/86
4,577,843	06/651,142	3/25/86
4,577,854	06/467,058	3/25/86
4,577,856	06/524,055	3/25/86
4,577,857	06/502,224	3/25/86
4,577,869	06/697,565	3/25/86
4,577,876	06/701,919	3/25/86
4,577,877	06/742,887	3/25/86
4,577,878	06/614,787	3/25/86
4,577,880	06/568,720	3/25.86
4,577,882	06/679,462	3/25/86
4,577,886	06/634,554	3/25/86
4,577,892	06/529,743	3/25/86
4,577,895	06/573,216	3/25/86
4,577,901	06/729,120	3/25/86
4,577,905	06/511,463	3/25/86
4,577,929	06/581,962	3/25/86
4,577,936	06/656,807	3/25/86
4,577,937	06/656,569	3/25/86
4,577,938	06/651,015	3/25/86
4,577,939	06/659,813	3/25/86
4,577,944	06/675,507	3/25/86
4,577,947	06/705,141	3/25/86
4,577,954	06/586,672	3/25/86
4,577,955	06/553,108	3/25/86
4,577,963	06,547,394	3/25/86
4,577,966	06/578,758	3/25/86
4,577,971	06/457,366	3/25/86
4,577,975	06/650,278	3/25/86
4,577,980	06/634,084	3/25/86
4,578,007	06/588,355	3/25/86
4,578,016	06/506,201	3/25/86
4,578,026	06/569,158	3/25/86
4,578,038	06/745,373	3/25/86
4,578,042	06/472,091	3/25/86
4,578,051	06/705,325	3/25/86
4,578,052	06/418,129	3/25/86
4,578,058	06/595,676	3/25/86
4,578,082	06/567,798	3/25/86
4,578,083	06/495,149	3/25/86
4,578,108	06/730,156	3/25/86
4,578,110	06/607,466	3/25/86
4,578,126	06/506,683	3/25/86
4,578,137	06/572,940	3/25/86
4,578,148	06/667,314	3/25/86
4,578,155	06/713,660	3/25/86
4,578,157	06/657,098	3/25/86
4,578,175	06/595,759	3/25/86
4,578,192	06/639,404	3/25/86
4,578,219	06/663,058	3/25/86
4,578,237	06/530,458	3/25/86
4,578,241	06/641,073	3/25/86
4,578,243	06/737,959	3/25/86
4,578,246	06/591,212	3/25/86
4,578,249	06/529,175	3/25/86
4,578,254	06/665,380	3/25/86
4,578,272	06/735,275	3/25/86
4,578,287	06/658,930	3/25/86
4,578,305	06/607,900	3/25/86
4,578,309	06/636,009	3/25/86
4,578,329	06/554,803	3/25/86
4,578,332	06/669,990	3/25/86
4,578,351	06/622,761	3/25/86
4,578,367	06/702,658	3/25/86
4,578,377	06/723,709	3/25/86
4,578,379	06/676,589	3/25/86
4,578,385	06/670,539	3/25/86
4,578,386	06/578,916	3/25/86
4,578,389	06/649,099	3/25/86
4,578,393	06/663,232	3/25/86
4,578,402	06/712,195	3/25/86
4,578,407	06/364,117	3/25/86
4,578,452	06/633,005	3/25/86
4,578,461	06/673,259	3/25/86
4,578,466	06/651,495	3/25/86
4,578,475	06/573,983	3/25/86
4,578,506	06/355,953	3/25/86
4,578,520	06/679,272	3/25/86
4,578,525	06/535,879	3/25/86
4,578,535	06/608,115	3/25/86
4,578,538	06/610,963	3/25/86
4,578,542	06/607,784	3/25/86
4,578,544	06/447,242	3/25/86
4,578,547	06/656,700	3/25/86
4,578,556	06/636,062	3/25/86
4,578,557	06/688,957	3/25/86
4,578,565	06/678,460	3/25/86
4,578,569	06/505,903	3/25/86
4,578,574	06/428,577	3/25/86
4,578,579	06/528,503	3/25/86
4,578,585	06/555,100	3/25/86
4,578,593	06/668,210	3/25/86
4,578,597	06/552,036	3/25/86
4,578,600	06/460,953	3/25/86
4,578,603	06/478,098	3/25/86
4,578,608	06/714,763	3/25/86
4,578,627	06/622,248	3/25/86
4,578,637	06/597,772	3/25/86
4,578,648	06/600,723	3/25/86
4,578,650	06/504,572	3/25/86
4,578,664	06/761,293	3/25/86
4,578,673	06/512,284	3/25/86
4,578,679	06/491,939	3/25/86
4,578,682	06/591,421	3/25/86
4,578,685	06/604,723	3/25/86
4,578,700	06/614,322	3/25/86
4,578,708	06/531,210	3/25/86
4,578,710	06/607,915	3/25/86
4,578,726	06/465,761	3/25/86
4,578,738	06/670,405	3/25/86
4,578,741	06/400,453	3/25/86
4,578,748	06/427,926	3/25/86
4,578,762	06/509,920	3/25/86
4,578,765	06/543,037	3/25/86
4,578,768	06/597,132	3/25/86
4,578,786	06/628,687	3/25/86
4,578,790	06/502,710	3/25/86
4,578,798	06/589,764	3/25/86

NOTIFICATION OF ACCEPTANCE OF DELAYED PAYMENT OF MAINTENANCE FEE (35 U.S.C 41(c); 37CFR 1.378)

The patent (s) listed below is considered as not having expired but is subject to the conditions set forth in 35 U.S.C. 41(c)(2), in view of the Petition to Accept Late Payment of the maintenance fees which has been GRANTED BY THE COMMISSIONER OF PATENTS AND TRADEMARKS, as provided for under 35 U.S.C. 41(c)(1) and 37 CFR 1.378.

Patent No.	Serial No.	Patent Date	Application Filing Date	Delayed Payment Acceptance Date
4,458,494	06/425,636	7/10/84	9/28/82	5/04/90

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

4,629,723, Re. S. N. 07/514,184, Filed Apr. 25, 1990, Cl. 514/17, POTENT THYMOPENTIN ANALOGS, Gideon Goldstein, Owner of Record: *Ortho Pharmeceutical Corp., Raritan, N. J.*, Attorney or Agent: Mary E. Bak, Ex. Gp.: 186

4,729,081, Re. S. N. 07/472,117, Filed Jan. 30, 1990, Cl. 363/017, POWER-TRACTOR-CORRECTED AC/DC CONVERTER, Ole K. Nilssen, Owner of Record: *Inventor*, Attorney or Agent: None, Ex. Gp.: 212

4,741,951, Re. S. N. 07/451,676, Filed Dec. 15, 1989, Cl. 428/366, METHOD FOR FORMING THERMOFORMABLE POLYURETHARE FOAM ARTICLES, Michael A. Ricciardi, et al., Owner of Record: *Knoll International Holdings, Inc., New York, N. Y.*, Attorney or Agent: Stanton T. Lawrence, Ex. Gp.: 154

4,822,623, Re. S. N. 07/460,283, Filed Dec. 28, 1989, Cl. 426/39, PROCESS OF USING RENNET CASEIN FOR PRODUCING IMITATION CHEESE, Jerry L. Middleton, Owner of Record: *Universal Foods Corp., Milwalkee, Wis.*, Attorney or Agent: Donald A. Peterson, Ex. Gp.: 132

4,857,015, Re. S. N. 07/515,160, Filed Apr. 26, 1990, Cl. 439/610, ENVIRONMENTALLY SEALED GROUNDING BACKSHELL WITH STRAIN RELIEF, Leonard H. Michaels, et al., Owner of Record: *Molex Incorporated, Lisle, Ill.*, Attorney or Agent: Stephen Z. Weiss, Ex. Gp.: 322

4,863,307, Re. S. N. 07/511,315, Filed Apr. 19, 1990, Cl. 404/7, RESTRAINT EDGE FOR PAVING MEMBERS, Stephen Jones, Owner of Record: *Inventor*, Attorney or Agent: Donald D. Evenson, Ex. Gp.: 356

4,874,747, Re. S. N. 07/513,970, Filed Apr. 24, 1990, Cl. 514/23, POLYCYCLIC HETEROCYCLIC COMPOUNDS, A PROCESS FOR THEIR PREPARATION AND THEIR USE IN HUMAN AND VETERINARY MEDICINE, Braham Shroot, et al., Owner of Record: *Centre International de recherches Dermatologiques (CIRD), Valbonne, France*, Attorney or Agent: Donald B. Deaver, Ex. Gp.: 183

REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b).

Re. 32,552, Reexam. No. 90/002,005, Requested Apr. 18, 1990, Cl. 340/632, GASEOUS IMPURITY DETECTOR EMPLOYING CORONA DISCHARGE PHENOMENON, Leonard Liebermann, et al., Owner of Record: *TIF Instruments, Inc., Miami, Fla.*, Attorney or Agent: Unknown, Ex. Gp.: 260, Requester: CPS Inc., Hileah, Fla.

Re. 33,090, Reexam. No. 90/002,001, Requested Apr. 16, 1990, Cl. 36/9, ISOTHERMIC PROTECTIVE BOOT, Ramon Berguer, Owner of Record: *Lunax Corp., New Baltimore, Mich.*, Attorney or Agent: Barnes, Kisselle, Raisch, et al., Ex. Gp.: 240, Requester: Charles W. Chandler, Livonia, Mich.

3,723,656, Reexam. No. 90/002,003, Requested Apr. 18, 1990, Cl. 379/82, TELEPHONE ANSWERING SYSTEM, Lawrence A. Curtis, et al., Owner of Record: *Virsonic Corp., Compton, Calif.*, Attorney or Agent: Jessup & Beecher, Ex. Gp.: 230, Requester: Lowe, Price, Le Blanc, et al., Alexandria, Va.

4,318,964, Reexam. No. 90/002,002, Requested Apr. 17, 1990, Cl. 428/572, AUTOPIN MACHINE, Irwin Zahn, et al., Owner of Record: *Inventor, New York, N.Y.*, Attorney or Agent: Lerner, David, Littenberg & Samuel, Ex. Gp.: 220, Requester: Autosplice, Inc., Woodside, N.Y.

4,660,698, Reexam. No. 90/002,000, Requested Apr. 13, 1990, Cl. 192/045, ONE WAY CLUTCH, Osamu Miura, Owner of Record: *Tok Bearing Co., Inc.*, Attorney or Agent: H. C. Miskin, Ex. Gp.: 350, Requester: Wenderoth, Lind & Ponack, Washington, D.C.

4,759,967, Reexam. No. 90/002,006, Requested Apr. 23, 1990, Cl. 428/154, EMBOSSING PROCESS AND PRODUCT, Robert Bauerfeind, Owner of Record: *Kimberly-Clark Corp., Neenah, Wis.*, Attorney or Agent: Gregory E. Croft, Ex. Gp.: 150, Requester: Owner

4,761,968, Reexam. No. 90/002,007, Requested Apr. 25, 1990, Cl. 62/271, HIGH EFFICIENCY AIR DRYING SYSTEM, Sanjiv Basseen, et al., Owner of Record: *Pioneer Air Systems, Inc., Wartburg, Tenn.*, Attorney or Agent: Pitts & Brittian, Ex. Gp.: 340, Requester: Deltech Engineering, New Castle, Del.

4,820,621, Reexam. No. 90/002,004, Requested Apr. 18, 1990, Cl. 430/331, DEVELOPER SOLUTION FOR POSITIVE WORKING PHOTORESIST COMPOSITIONS COMPRISING A BASE AND A NON-TOXIC SURFACTANT, Hatsuyuki Tanka, et al., Owner of Record: *Tokyo Ohka Kogyo Co., Kanagawa, Japan*, Attorney or Agent: Hopgood, Calumafde, Kalil, Blaustein, et al., Ex. Gp.: 150, Requester: Ciba-Geigy Corp., Hawthorne, N.Y.

4,821,492, Reexam. No. 90/002,008, Requested Apr. 26, 1990, Cl. 53/458, METHOD OF MAKING END FILL MICROWAVABLE AND/OR OVENABLE CONTAINER, Donald R. Prater, Owner of Record: *James River Corp., Norwalk, Conn.*, Attorney or Agent: Charles M. Leedom, Jr., Ex. Gp.: 350, Requester: Owner

4,838,421, Reexam. No. 90/001,999, Requested Apr. 11, 1990, Cl. 206/387, MULTIPLE USE CASSETTE CARRYING CASE, Patrick Mastronardo, Owner of Record: *Lebo Peerless, Inc., Bloomfield, N.J.*, Attorney or Agent: Marvin Feldman, Ex. Gp.: 240, Requester: Case Logic, Inc., Boulder, Colo.,

Errata

"All reference to Patent No. D-305,253 to Robert B. Montgomery of Canterbury, England for TOY ANIMAL ap-

pearing in the Official Gazette of Dec. 26, 1989 should be deleted since no patent was granted."

"All reference to Patent No. 4,917,437 to Rainer Machate et al., of Germany for PIECE OF SEATING FURNITURE appearing in the Official Gazette of Apr. 17, 1990 should be deleted since no patent was granted."

"All reference to Patent No. 4,893,000 to Winslow E. Jackson of Monroe, Conn. for SYSTEM FOR SECURELY CONTROLLING POSTAGE FUNDS appearing in the Official Gazette of Jan. 9, 1990 should be deleted since no patent was granted."

NOTICE OF SUSPENSION

Irving J. Levin of Beverly Hills, Calif., whose registration number is 24,609, has been suspended for a period of three years, execution of the suspension being stayed subject to compliance with conditions imposed in a FINAL ORDER. This action is being taken under provisions of 35 U.S.C. 32, and 37 CFR 10.130 and 10.133(g).

May 10, 1990

CAMERON WEIFFENBACH,
Director
Office of Enrollment and Discipline

Service by Publication

A petition to cancel each of the registraions identified below having been filed, and the notice of such proceedings sent by certified mail to registrant at the last known address having been returned by the Postal Service as undeliverable, notice is hereby given that unless the registrants listed herein, their assigns or legal representatives shall enter an appearance within thirty days from the date of this publication, the cancellation will be proceeded with as in the case of default.

Belgian Chocolate, Ltd., New York, N.Y., Reg. No. 1,380,652, for the mark "VERSAILLES", Canc. No. 18,148.

Philip B. Watson, Jr., Huntington Beach, Calif., Reg. No. 1,453,2662, for the mark "CORONA BEACH CLUB", Canc. No. 18,465.

JEAN BROWN
Administrator, Trademark Trial and Appeal Board
for JEFFREY M. SAMUELS
Assistsant Commissioner for Trademarks

In re Eckerle
Reexamination Proceeding
Control No. 90/000,749

DECISION ON PETITION

Filed: March 28, 1985
For: U.S. Patent No. 4,042,890

Petitioner Eckerle filed a petition on March 30, 1990, under 37 CFR § 1.181, or in the alternative under 37 CFR § 1.182, seeking review of a Notice of Intent to Issue a Reexamination Certificate entered March 22, 1990, indicating the cancellation of claims 1-16, all the claims of the patent. Petitioner requests the Commisioner to direct entry of an amendment filed Feb. 7, 1990, and to issue and publish a reexamination certificate indicating the patentability of claims consistent with that amendment. The petition is denied.

In *In re Eckerle*, No. 89-1552 (Fed. Cir Dec. 8, 1989), the Federal Circuit affirmed the examiner's rejection of claims 1-16 (all the claims in the patent) under 35 U.S.C. § 112, first paragraph, for lack of written description of an added limitation to claim 1, and the rejection of claims 1-6, 10-13 and 15 as unpatentable under 35 U.S.C. § 103. The Federal Circuit's mandate issued on December 29, 1989. Reexamination proceedings were terminated in this case when the PTO received the mandate on Jan. 3, 1990. No claims were allowable at the time the reexamination proceeding terminated.

Under 35 U.S.C. § 306 and § 144, the Federal Circuit's mandate and opinion shall govern further proceedings in the case. Under 35 U.S.C. § 307, when any appeal proceeding has terminated, the Commissioner will issue and publish a certificate cancelling any claim of the patent finally determined to be unpatentable. The examiner's Notice of Intent to Issue a Reexamination Certificate indicating the cancellation of claims 1-16 was proper.

The Commissioner lacks authority to reopen the reexamination proceeding after receipt of the mandate where all claims have been rejected since the case is no longer considered pending. *See* MPEP § 1216.06 (5th ed., rev. 12, July 1989) under "Office Procedure Following Decision by the Federal Circuit," subheading "1. All claims rejected"; *In re Willis*, 537 F.2d 513, 515, 190 USPQ 327, 329 (CCPA 1976) ("When, on January 12, 1976, our mandate was received in the PTO, no claims having been allowed, the appealed application suffered its demise."); *In re Jones*, 542 F.2d 65, 69, 191 USPQ 249, 252 (CCPA 1976) ("[R]eceipt of the mandate by the PTO terminated proceedings in the case"); *Continental Can Co. v. Schuyler*, 326 F. Supp. 283, 284, 168 USPQ 625, 625 (D.D.C. 1970) ("[W]here rejection of all claims is affirmed by the Court of Customs and Patent Appeals, as in this case, the responsibiliity is upon the plaintiff to stay the Court's judgment if the pendency of the application is to be preserved"); *Morganroth v. Quigg*, 885 F.2d 843, 847, 12 USPQ2d 1125, 1128 (Fed. Cir. 1989) (Commissioner does not have authority to revive application abandoned by termination of proceedings resulting from a failure to appeal a final district court judgment). Petitioner's relief, if any, lies in a motion for the Federal Circuit to withdraw its mandate, not with the Commissioner. *See Jones*, 542 F.2d at 68, 191 USPQ at 252 (CCPA "has the power, in the interest of justice, to recall its mandate in an appropriate case, and this power should be exercised sparingly and only upon a showing of good cause").

The petition does not state all the material facts. In particular, it fails to mention the dispositive fact that all claims were rejected under 35 U.S.C § 112, first paragraph, at the time reexamination proceedings terminated. The examiner stated in the Notice of March 22, 1990, the Commissioner lacks jurisdiction to reopen the reexamination proceedings after issuance of the mandate where no claims have been allowed. Petitioner fails to address the issue of the Commissioner's authority to reopen the reexamination proceedings. Petitioner's arguments that the amendment was timely because "no adequate opportunity was presented until at least the decision of the Board to file the attached amendment" (Petition, page 3), and that an amendment presented after the decision of the board would "have merely been held in abeyance pending the outcome [in the Federal Circuit]" (Petition, page 3), are unpersuasive. The amendment could have been filed after the Federal Circuit's decision and before issuance of the mandate; instead, the amendment was not filed until 5 weeks after receipt of the mandate.

The petition is *denied*.

Reexamination proceedings are to be conducted with "special dispatch." 35 U.S.C. § 305. In order not to unduly delay issuance of the reexamination certificate, petitioner is given ten (10) days to file any request for reconsideration.

JAMES E. DENNY
Acting Assistant Commissioner for Patents

PATENT NOTICES

Certificates of Correction For Week of June 5, 1990

D. 289,648	4,814,463	4,838,203	4,851,294
D. 301,955	4,814,612	4,838,351	4,851,382
Re. 33,031	4,815,914	4,838,592	4,851,532
3,931,423	4,816,244	4,838,666	4,851,631
4,600,982	4,816,563	4,839,101	4,851,762
4,630,749	4,816,910	4,839,917	4,851,878
4,632,593	4,817,471	4,839,983	4,852,015
4,707,641	4,818,984	4,940,986	4,852,021
4,731,814	4,819,162	4,841,225	4,852,022
4,736,080	4,819,255	4,841,420	4,852,657
4,744,742	4,819,335	4,842,466	4,853,069
4,745,168	4,819,468	4,842,578	4,853,292
4,755,894	4,820,559	4,842,631	4,853,846
4,759,417	4,820,698	4,842,877	4,854,039
4,766,094	4,821,105	4,843,049	4,854,123
4,769,815	4,821,264	4,843,419	4,854,202
4,770,814	4,822,286	4,843,876	4,854,648
4,775,490	4,822,789	4,843,981	4,854,824
4,778,237	4,822,810	4,844,155	4,854,894
4,778,325	4,823,816	4,844,207	4,854,941
4,778,639	4,824,639	4,844,446	4,855,040
4,783,700	4,824,835	4,844,479	4,855,334
4,784,534	4,826,634	4,844,573	4,855,353
4,785,294	4,826,667	4,844,741	4,855,455
4,789,650	4,826,886	4,845,009	4,855,511
4,798,362	4,827,016	4,845,260	4,855,918
4,799,070	4,827,017	4,845,539	4,855,966
4,799,526	4,827,101	4,845,601	4,856,467
4,800,032	4,827,789	4,846,70[illegible]	4,857,826
4,800,938	4,827,968	4,846,785	4,858,099
4,801,355	4,828,346	4,847,390	4,858,931
4,802,523	4,829,137	4,848,013	4,858,978
4,804,680	4,829,674	4,848,081	4,859,326
4,806,046	4,831,065	4,848,094	4,865,407
4,806,345	4,832,363	4,848,148	4,873,244
4,807,117	4,834,488	4,848,849	4,877,568
4,810,962	4,834,547	4,849,983	4,902,096
4,812,492	4,834,716	4,850,148	4,909,618
4,813,788	4,834,729	4,850,222	4,910,303
4,813,918	4,835,356	4,850,740	
4,814,034	4,837,075	4,850,788	
4,814,047	4,837,575	4,851,246	

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Box ITU	All Intent to Use documents excluding the initial application and amendments to allege use.
Box M. Fee	Correspondence related to a patent that is subject to the payment of a maintenance fee.
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Box OED	Mail for the Office of Enrollment and Discipline.
Box Pat. Ext.	Applications for patent term extension.
Box PCT	Mail related to applications filed under the Patent Cooperation Treaty.
Box Reexam	Mail related to Reexamination.
Box SN	For fee and petitions under 37 CFR 1.182 to obtain date received and/or serial number for patent application *prior* to the Office's standard notification (return post card or the official "Filing Receipt," "Notice to File Missing Parts," or "Notice of Incomplete Application").
PATENT APPLICATION	New patent application and associated papers and fees.
TRADEMARK APPLICATION	New trademark application and associated papers and fees.
Box Assignments	All assignment documents except those filed in new patent applications.

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These patent collections, which are organized in patent number sequence, are available for use by the public free of charge. Each of the PDLs, in addition, offers supplemental reference publications of the U.S. Patent Classification System, including the *Manual of Classification, Index to the U.S. Patent Classification, Classification Definitions*, and provides technical staff assistance in their use to aid the public, in gaining effctive access to information contained in patents. CASSIS (Classification And Search Support Information System); which provides direct, on-line access to Patent and Trademark Office data, is available at all PDLs. Facilities for making paper copies of patents from either microfilm or paper collections are generally provided for a fee.

Since there are variations in the scope of patent collections among the PDLs and in their hours of service to the public, anyone contemplating use of the patents at a particular library is urged to contact that library, in advance, about its collection and hours in order to avert possible inconvenience.

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	Milwaukee Public Library	(414) 278-3247

PATENT EXAMINING CORPS

JAMES E. DENNY, Acting Assistant Commissioner
STEPHEN G. KUNIN, Acting Deputy Assistant Commissioner
CONDITION OF PATENT APPLICATIONS AS OF April 7, 1990

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director	7-7-87
ORGANIC CHEMISTRY GROUP 120—S. N. ZAHARNA, Director	10-18-88
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 130—R. V. FISHER, Acting Director	5-27-87
HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director	4-5-88
BIOTECHNOLOGY, GROUP 180—J. E. KITTLE, Director	1-28-87
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—D. G. Kelly, Director	10-15-87
SPECIAL LAWS ADMINISTRATION, GROUP 220—K. L. CAGE, Director	2-27-87
INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230—G. GOLDBERG, Director	2-29-88
PACKAGES, CLEANING, TEXTILES, AND GEOMETRICAL INSTRUMENTS, GROUP 240—TRYGVE M. BLIX, Director	11-9-88
ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250—EDWARD E. KUBASIEWICZ, Director	3-23-88
COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP 260 STEWART LEVY, Acting Director	3-30-88
DESIGN, GROUP 290—K. L. CAGE, Director	2-6-86
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director	3-24-89
MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—N. GODICI, Acting Director	6-23-88
MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—J. J. LOVE, Director	10-25-88
SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—C. CROYLE, Acting Director	2-26-88
GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350—A. L. SMITH, Director	4-2-89

Expiration of patents: The patents within the range of numbers indicated below expire during April 1990 except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents ..... Numbers 3,723,992 to 3,729,743 inclusive
Plant Patents ..... None

REEXAMINATIONS

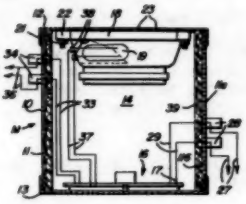
JUNE 5, 1990

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

B1 4,185,167 (1296th)
SOUND MASKING PACKAGE

Donald R. Cunningham, Randolph, and James E. Sulewsky, Mendham, both of N.J., assignors to Acoustical Design Incorporated

Reexamination Request No. 90/001,780, Jun. 5, 1989.
Reexamination Certificate for Patent No. 4,185,167, issued Jan. 22, 1980, Ser. No. 933,024, Aug. 11, 1978.
Continuation of Ser. No. 700,595, Jun. 28, 1976, abandoned.
Int. Cl.[5] H04R *3/00*
U.S. Cl. 381—73.1



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claim 1 is determined to be patentable as amended.

Claims 2 and 3, dependent on an amended claim, are determined to be patentable.

1. A self-contained sound masking package comprising, in combination, a closed housing having an acoustically permeable top wall, a side wall, and a bottom wall, defining an interior, circuit means formed as a printed circuit board with an electric circuit arranged on said printed circuit board disposed within said housing interior including means for supporting said circuit means adjacent said bottom wall in parallel relationship therewith for producing a plurality of signal voltages having frequencies at predetermined relative decibel levels, said levels thereby forming at least two selectable spectrums having respective frequencies at different decibel levels, switch means connected to said electric circuit for selecting one of said spectrums, a loudspeaker having a speaker cone and a coil [and wherein said signal voltages are applied to said loudspeaker coil by said connecting means] disposed within said housing including means for supporting said loudspeaker adjacent said acoustically permeable top wall and being directed outwardly for introducing an audio output signal into the area surrounding said housing, sound damping material affixed to the inner surface of said side wall, means for connecting said circuit means to an associated source of electric power, means for connecting the output of said circuit means to said loudspeaker for applying the plurality of signal voltages from said circuit means to said loudspeaker *coil* to produce said audio output signal within said audible frequency range and with the frequencies in said audible frequency range at said predetermined relative decibel levels, level control means for adjusting the level of said audio output signal, and means for connecting an associated remote signal source to said circuit means for applying said remote signal to said loudspeaker to provide an audio output signal corresponding to said remote signal in addition to the audio signal produced by said circuit means into the area surrounding the housing.

B1 4,391,928 (1297th)
OPACIFYING POLYMERIC PARTICLES AND USES

Daniel F. Herman, Princeton, and Uno Kruse, East Windsor, both of N.J., assignors to NL Chemicals, Inc., New York, N.Y.

Reexamination Request No. 90/001,621, Oct. 17, 1988.
Reexamination Certificate for Patent No. 4,391,928, issued Jul. 5, 1983, Ser. No. 299,360, Sep. 4, 1981.
Int. Cl.[5] C09D *7/12*
U.S. Cl. 523—201

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims 2, 3 and 16 is confirmed.

Claims 1 and 4 are determined to be patentable as amended.

Claims 5–15 dependent on an amended claim, are determined to be patentable.

1. [A latex coating] *An aqueous latex dispersion paint* composition *which forms at ambient temperatures into a hardened paint film* of improved opacity and film characteristics, said [coating] composition comprising discrete capsules comprising a solid polymeric core *having a diameter of from about 0.4 to about 1.0 micron* surrounded by a solid polymeric shell having a Tg less than about 45° C., wherein the weight ratio of said shell to the total weight of said capsule ranges from 0.25:1 to 0.5:1.

B1 4,398,029 (1298th)
QUINOLINE CARBOXYLIC ACID DERIVATIVES AND PROCESS FOR THE PREPARATION

Tsutomu Irikura, Oizumigakuen; Hiroshi Koga, Omiya, and Satoshi Murayama, Nogi, all of Japan, assignors to Kyorin Seiyaku Kabushiki Kaisha, Tokyo, Japan

Reexamination Request No. 90/001,739, Mar. 30, 1989.
Reexamination Certificate for Patent No. 4,398,029, issued Aug. 9, 1983, Ser. No. 236,168, Feb. 20, 1981.
Int. Cl.[5] C07D *401/04*; A61K *31/495*
U.S. Cl. 544—463

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claim 2 is confirmed.

Claims 1 and 3 are cancelled.

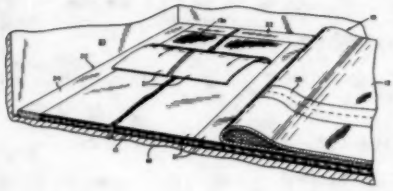
2. 6,8-Difluoro-1-(2-fluoroethyl)-1,4-dihydro-7-(4-methyl-1-piperazinyl)-4-oxoquinoline-3-carboxylic acid, the hydrates, or the pharmaceutically acceptable salts thereof.

B1 4,557,774 (1299th)

SYSTEM FOR HOLDING CARPET IN PLACE WITHOUT STRETCHING

Merle R. Hoopengardner, Lafayette, Calif., assignor to Jactac, Inc.

Reexamination Request No. 90/001,692, Jan. 20, 1989.
Reexamination Certificate for Patent No. 4,557,774, issued Dec. 10, 1985, Ser. No. 647,119, Sep. 4, 1984.
Filed Jan. 20, 1989, Ser. No. 647,119
Int. Cl.[5] E04B *2/00*; E04F *13/00*; B32B *5/14, 7/12*
U.S. Cl. 156—71



AS A RESULT OF REEXAMINATION IT HAS BEEN DETERMINED THAT:

The patentability of claims **8–15** and **18–21** is confirmed.

Claim **7** is cancelled.

Claims **1** and **16** are determined to be patentable as amended.

Claims **2–6** and **17** dependent on an amended claim, are determined to be patentable.

New claim **22** is added and determined to be patentable.

1. A carpet pad for installation between a floor and a carpet *in a wall-to-wall carpet installation*, for retaining the *wall-to-wall* carpet and pad in place by adhesion without need for stretching, comprising:

a pad with upper and lower surfaces and of such thickness, density and compressibility as to enable it to serve as a carpet padding;

a scrim webbing on at least the lower surface of the pad for maintaining dimensional stability of the pad, with means for retaining the scrim webbing to the pad;

a sealant applied to both surfaces of the pad; and

pressure-sensitive adhesive on both surfaces of the pad *with sufficient tackiness* for adhering to a floor and to the underside of a carpet to hold *and bond* the carpet and pad *securely* in position while allowing for temporary lifting of the carpet wholly or in localized areas when desired.

B1 4,615,937 (1300th)

ANTIMICROBIALLY ACTIVE NON-WOVEN WEB USED IN A WET WIPER

Michael P. Bouchette, Appleton, Wis., assignor to The James River Corp.

Reexamination Request No. 90/001,788, Jun. 13, 1989.
Reexamination Certificate for Patent No. 4,615,937, issued Oct. 7, 1986, Ser. No. 772,845, Sep. 5, 1985.
Int. Cl.[5] D04H *1/58*
U.S. Cl. 428—288

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **1–12** is confirmed.

1. An antimicrobially active, non-woven web comprising:

(a) bonded fibers;

(b) a binder substantially uniformly distributed on the fibers, the binder being present in an amount effective to bind the fibers; and

(c) an antimicrobial agent substantially uniformly distributed on the fibers, the antimicrobial agent being substantive to the fibers and to the binder when the web is either wet or dry to prevent the antimicrobial agent from substantially diffusing from the fibers or the binder.

STATUTORY INVENTION REGISTRATIONS

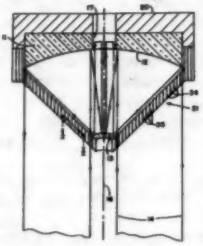
PUBLISHED JUNE 5, 1990

A statutory invention registration is not a patent. It has the defensive attributes of a patent but does not have the enforceable attributes of a patent. No article or advertisement or the like may use the term patent, or any term suggestive of a patent, when referring to a statutory invention registration. For more specific information on the rights associated with a statutory invention registration see 35 U.S.C. 157.

H783
TELESCOPE WITH IMPROVED MIRROR SUPPORT

Alan B. Callender, Stuart, Fla., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Dec. 26, 1989, Ser. No. 456,898
Int. Cl.[5] G02B *5/10*
U.S. Cl. 350—620 **5 Claims**



1. A telescope, comprising
a. a primary mirror having a central axis and a central aperture centered on said axis,
b. a secondary mirror spaced from and positioned on the axis of the primary mirror to receive reflected light from the primary mirror and reflect it through the central aperture in the primary mirror,
c. means for supporting the primary mirror, and
d. a conical support member attached to the primary mirror support means for supporting the secondary mirror, said conical member being in the form of a honeycomb having therein openings extending in a direction parallel to said axis.

H784
COPOLYFORMALS OF 1,2-BIS(2-HYDROXYETHYL)-1,2-DICARBADODECABORANE(12) AND POLYFLUOROALKYL DIOLS

Horst G. Adolph, Burtonsville, and Lori A. Nock, Baltimore, both of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

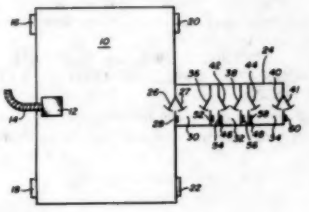
Filed Aug. 2, 1989, Ser. No. 389,217
Int. Cl.[5] C08G *4/00, 6/00*
U.S. Cl. 528—241 **16 Claims**

10. A dihydroxy-terminated copolyformal formed from
A. formaldehyde and
B. a diol comonomer mixture wherein
(1) from more than zero to less than 50 mole percent of the diol comonomer mixture is 1,2-bis(2-hydroxyethyl)-1,2-dicarbadodecaborane(12), and
(2) the remainder of the diol comonomer mixture is a fluorodiol/nitrodiol mixture of
(a) a fluorodiol which is $HOCH_2CF_2CF_2CF_2CH_2OH$, $HOCH_2CF_2CF_2CF_2CF_2CH_2OH$, $HOCH_2CF(CF_3)OCF_2CF_2CF_2CH_2OH$, $HOCH_2CF_2OCF_2CF_2OCF_2CH_2OH$, $HOCH_2CH_2(CF_2)_2CH_2CH_2OH$, $HOCH_2CH_2(CF_2)_4CH_2CH_2OH$, $HOCH_2CH_2(CF_2)_6CH_2CH_2OH$, $HOCH_2CH_2(CF_2)_8CH_2CH_2OH$, $HOCH_2CH_2(CF_2)_{10}CH_2CH_2OH$, or mixtures thereof, and
(b) a nitrodiol which is $HOCH_2CH_2N(NO_2)CH_2CH_2OH$, $HOCH_2CH_2N(NO_2)CH_2C(NO_2)_2CH_2CH_2OH$, $HOCH_2CH_2N(NO_2)CH_2CH_2N(NO_2)CH_2CH_2OH$, $HOCH_2C(NO_2)_2CH_2OCH_2OCH_2C(NO_2)_2CH_2OH$, $HOCH_2CH_2N(NO_2)CH_2C(NO_2)_2CH_2N(NO_2)CH_2CH_2OH$, $HOCH_2CH_2C(NO_2)_2CH_2N(NO_2)CH_2C(NO_2)_2CH_2CH_2OH$, $HOCH_2CH_2CH_2C(NO_2)_2CH_2OCH_2OCH_2C(NO_2)_2CH_2CH_2CH_2OH$, $HOCH_2CH_2N(NO_2)CH_2C(NO_2)_2CH_2OCH_2OCH_2C(NO_2)_2CH_2N(NO_2)CH_2CH_2OH$, or mixtures thereof,
wherein the nitrodiol comprises from more than zero to less than 50 mole percent of the fluorodiol/nitrodiol mixture with the fluorodiol comprising the remainder.

H785
DECONTAMINATION APPARATUS AND METHOD

Mike Merritt, Rte. 2, Box 44J, Kilgore, Tex. 75662

Filed Oct. 18, 1989, Ser. No. 423,768
Int. Cl.[5] B01D *37/00*
U.S. Cl. 55—97 **13 Claims**



1. Apparatus for decontamination comprising:
a sealed work space having first filtered passage means for conducting air between the work space to outside the work space,
first sealed door means for access to the work space,
blower means for removing air from the work space, and
second filtered means to filter air passing through the blower means.
8. The method of decontamination comprising the steps of;
establishing a sealed work space surrounding the hazardous materials
providing filtered inlet air passages,
blowing air from the work space to outside the work space,
filtering the air blown from the work space,
whereby leakage of air to the work space will be from outside into the work space, and
whereby failure to maintain the step of blowing air will still provide filtered air between the work space and outside the work space.

H786
COPOLYFORMALS OF 1,2-BIS(2-HYDROXYETHYL)-1,2-DICARBADODECABORANE AND POLYNITROALKYL DIOLS

Horst G. Adolph, Burtonsville, and Lori A. Nock, Baltimore, both of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 2, 1989, Ser. No. 389,239
Int. Cl.[5] C08G *4/00*
U.S. Cl. 528—4 **19 Claims**

1. A dihydroxy-terminated copolyformal formed from

A. formaldehyde and

B. a diol comonomer mixture of

(1) 1,2-bis(2-hydroxyethyl)-1,2-dicarbadodecaborane(12) and

(2) a nitrodiol selected from the group consisting of $HOCH_2CH_2N(NO_2)CH_2CH_2OH$, $HOCH_2CH_2N(NO_2)CH_2C(NO_2)_2CH_2CH_2OH$ $HOCH_2CH_2N(NO_2)CH_2CH_2N(NO_2)CH_2CH_2OH$, $HOCH_2C(NO_2)_2CH_2OCH_2OCH_2C(NO_2)_2CH_2OH$, $HOCH_2CH_2N(NO_2)CH_2C(NO_2)_2CH_2N(NO_2)CH_2CH_2OH$, $HOCH_2CH_2C(NO_2)_2CH_2N(NO_2)CH_2C(NO_2)_2CH_2CH_2OH$, $HOCH_2CH_2CH_2C(NO_2)_2CH_2OCH_2OCH_2C(NO_2)_2CH_2CH_2OH$, $HOCH_2CH_2N(NO_2)CH_2C(NO_2)_2CH_2OCH_2OCH_2C(NO_2)_2CH_2N(NO_2)_2CH_2CH_2OH$, and mixture thereof,

wherein 1,2-bis(2-hydroxyethyl)-1,2-dicarbadodecaborane(12) comprises from more than zero to less than 50 mole percent of the diol comonomer mixture with the nitrodiol being the remainder, and

wherein the terminal functional groups of the copolyformal are hydroxy groups.

H787
CARBOHYDRAZINIUM DINITRATE

Steven L. Collignon, Waldorf, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jul. 12, 1989, Ser. No. 379,034

Int. Cl.[5] **C06B** *47/08;* **D03D** *23/00;* **C01B** *21/12;* **C07C** *133/02*

U.S. Cl. 149—36 **5 Claims**

2. A slurry gun propellant in which the improvement comprises using carbohydrazinium dinitrate as an oxidizer.

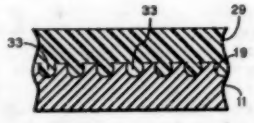
H788
METHOD FOR BONDING PLASTIC TO METAL

Clayton J. Schneider, Jr., East Aurora, N.Y., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed May 31, 1989, Ser. No. 359,461

Int. Cl.[5] **C23F** *1/00;* **B44C** *1/22;* **C03C** *15/00, 25/06*

U.S. Cl. 156—634 **10 Claims**



1. A method for bonding plastic to metal comprising the steps of:

(a) providing a metallic member for bonding plastic thereto;

(b) overlaying a mask onto a selected surface of said metallic member, said mask having a preselected pattern therein defining preselected masked and unmasked protions of said selected surface;

(c) chemically etching said unmasked portions of said selected surface to preselected depth into said selected surface whereby cavities in said selected surface are formed which at least in part increase in width with depth of etching; and

(d) applying a layer of plastic to said selected surface of said metallic member whereby a portion of said layer of plastic fills said cavities and forms an interlock with said selected surface.

H789
METHOD FOR PROCESSING A SILVER HALIDE PHOTOGRAPHIC MATERIAL

Shinji Ueda; Kei Sakanoue; Seiji Ichijima, and Hidetoshi Kobayashi, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-Ashigara, Japan

Filed Apr. 13, 1988, Ser. No. 180,874

Claims priority, application Japan, Apr. 14, 1987, 62-89821; Apr. 20, 1987, 62-95432

Int. Cl.[5] **G03C** *7/00*

U.S. Cl. 430—372 **11 Claims**

1. A method for processing a silver halide color photographic material comprising a silver bromoiodide emulsion layer having a silver iodide content of 40 mol % or less, which method comprises imagewise exposing a silver halide color-photographic light-sensitive material to light, color developing the light-sensitive material, and then desilvering the light-sensitive material, wherein:

(a) said silver halide color photographic light-sensitive material contains a compound which reacts with an oxidation product of an aromatic primary amine color developing agent to form a bleaching accelerator,

(b) said desilvering step is conducted with a processing solution containing a ferric complex salt of an organic acid, and

(c) the total amount of replenisher of the processing solution to be used in said desilvering step satisfies either the following conditions (i) or (ii);

(i) the total amount of replenisher if from 100 to 1,000 ml per m^2 of said light-sensitive material if the coated amount of silver per m^2 of said light-sensitive material is from 2.0 g to 20 g;

(ii) the total amount of replenisher is from 50 to 300 ml per m^2 of said light-sensitive material if the coated amount of silver per m^2 of said light-sensitive material is from 0.3 to less then 2.0 g.

H790
MODIFIED BLOCK COPOLYMERS

William P. Gergen, 11311 Hylander St., Houston, Tex. 77007; Robert G. Lutz, 632 Vista Grande Pl., Santa Rosa, Calif. 95401, and Carl L. Willis, 15922 Red Willow, Houston, Tex. 77084

Continuation-in-part of Ser. No. 766,217, Aug. 16, 1985. This application Feb. 17, 1988, Ser. No. 157,356

Int. Cl.[5] **C08F** *293/00, 295/00*

U.S. Cl. 525—314 **1 Claim**

1. A functionalized, selectively hydrogenated block copolymer to which has been grafted at least one imine functional group, said functionalized block copolymer comprising:

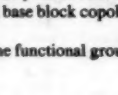
(1) a base block copolymer which comprises

(i) at least one polymer block A, said A block being at least predominantly a polymerized alkenyl arene block, and

(ii) at least one selectively hydrogenated polymer block B, said B block prior to hydrogenation being at least predominantly a polymerized conjugated diene block, and

(2) wherein substantially all of said imine functional groups are grafted to said base block copolymer on said A blocks; and

(3) wherein said imine functional group is represented by the general formula



wherein R_1 and R_2 are the same or different alkyl, cycloalkyl or aryl radicals and wherein R_3 is a hydrogen, alkyl, cycloalkyl, aryl or silyl radical.

H791

MULTILAYER ANALYTICAL ELEMENT FOR QUANTITATIVE ANALYSIS OF BILIRUBIN

Harumi Katsuyama; Shigeki Kageyama, and Shigeru Nagatomo, all c/o Fuji Photo Film Co., Ltd., 3-11-46, Senzui, Asaka-shi, Saitama, Japan

Continuation of Ser. No. 590,730, Mar. 19, 1984, abandoned. This application Oct. 8, 1987, Ser. No. 106,906
Claims priority, application Japan, Mar. 18, 1983, 58-45547
Int. Cl.[5] G01N *21/78, 33/72*
U.S. Cl. 422—56 **8 Claims**

1. A multilayer analytical element for quantitative analysis of bilirubin in a liquid sample which comprises, in this order,

(1) a porous reagent layer containing an acidic binder and a diazonium salt being reactive to bilirubin to produce azobilirubin;

(2) an absorbent layer comprising a hydrophilic polymer capable of absorbing a solvent in a liquid sample without accepting bilirubin in a liquid sample diffusing into said porous reagent layer; and

(3) a liquid-impermeable light-transmissive support.

H792

MAINLOBE CANCELLER WITH MOTION COMPENSATION FOR USE WITH RADAR SYSTEMS

Probal K. Sanyal, and Richard M. Davis, both of Syracuse, N.Y., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

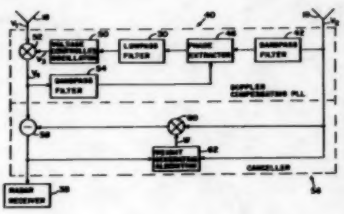
Filed Nov. 27, 1989, Ser. No. 441,749
Int. Cl.[5] G01S *7/36*
U.S. Cl. 342—17 **5 Claims**

1. A mainlobe jamming cancellation system for removing mainlobe interference signals in radar systems when relative motion exists between the sources of said interference signals and the receiving antennas, comprising:

(a) a main antenna for broadcasting and receiving radio signals;

(b) at least one auxiliary antenna spaced from said main antenna for receiving said interfering signals;

(c) means for multiplying, weighting, and summing said interference signals received by said at least one auxiliary antenna;



(d) means for aligning the frequencies of said multiplied and weighted signals with the frequency of the radio signals received by said main antenna;

(e) means for time-aligning the signals received by said main and auxiliary antennas;

(f) canceller means for subtracting said time-aligned signals from said signals received by said main antenna; and

(g) receiver means for receiving the residue of said main antenna signals for detecting a target.

REISSUES

JUNE 5, 1990

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 33,226

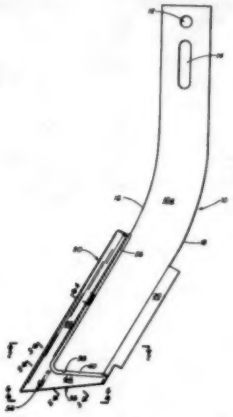
BLADE SHANK ASSEMBLY USED IN A FERTILIZER APPLICATOR ASSEMBLY

Delmar D. Edmisson, Guymon, Okla., assignor to Adams Hard-Facing Company, Inc., Guymon, Okla.

Original No. 4,719,862, dated Jan. 19, 1988, Ser. No. 881,734, Jul. 3, 1986. Application for reissue Aug. 3, 1989, Ser. No. 400,312

Int. Cl.[5] **A01C** *23/02*

U.S. Cl. 111—124 **2 Claims**



1. A fertilizer applicator knife assembly comprising:

a curved blade shank plate having a concave leading edge of substantially uniform thickness up and down its length and a convex trailing edge, an upper end and a lower end, and further having a pair of parallel side surfaces extending between the concave leading edge and the [concave] *convex* trailing edge;

a generally L-shaped protective hard metal wear insert secured to the concave leading edge of the blade shank plate, said L-shaped protective wear insert including:

an elongated, shank portion extending downwardly along the concave leading edge of the shank plate and being of increasing transverse thickness from its upper end [to] *downwardly in the direction of* its lower end, said shank portion having a leading edge and having a pair of side surfaces converging to said leading edge, and having a rear side extending between said side surfaces, said rear side of the shank portion of the insert having a width *over a major portion of its length* which is greater than the width of the leading edge of said shank plate [throughout the entire] *over a major portion of the* distance of contact of said wear metal insert with said leading edge of said shank [portion] *plate* whereby space adjacent the parallel side surfaces of said shank *plate* is defined by the overhang of the rear side surface of said elongated, shank portion of said hard metal wear insert for the accumulation and retention in said defined space of a protective layer of caked soil;

an enlarged, pointed head portion at the forward lower end of said shank portion, and constituting that portion of said insert having the greatest transverse width, said head portion having a width which is [at least twice] *substantially wider than* the narrowest transverse dimension of the shank portion of said insert; and

an elongated bottom sole extending rearwardly from the head portion along the lower side of the shank plate [and decreasing in transverse thickness from a location adjacent said head portion toward the rear end thereof], said bottom sole having a transverse thickness greater than the transverse thickness of said shank plate as measured between said parallel side surfaces and therefore providing an overhang which defines the protective soil layer retaining-space commonly defined by the cooperation of the overhanging bottom *sole* and the overhanging rear side of the shank portion of the wear insert.

Re. 33,227

GRADIENT INDEX TYPE SINGLE LENS

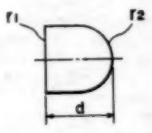
Takeshi Baba, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Original No. 4,647,159, dated Mar. 3, 1987, Ser. No. 686,153, Dec. 26, 1984. Application for reissue Mar. 2, 1989, Ser. No. 317,957

Claims priority, application Japan, Dec. 28, 1983, 58-245916; Apr. 25, 1984, 59-83287

Int. Cl.[5] **G02B** *3/00*

U.S. Cl. 350—413 **2 Claims**



1. A gradient index type single lens having an gradient index in a direction perpendicular to the optic axis thereof, wherein the surface of said single lens on the light beam incidence side when said single lens is used at a reduced magnification forms a planar surface and the surface of said single lens on the light beam emergence side forms a convex surface, said single lens satisfying the following conditions:

$$0.55 \leqq (1-N_0)\cdot f/r_2 \leqq 1.20$$

$$0.8 \leqq d/f \leqq 2.2$$

where r_2 is the radius of curvature of the surface on said light beam emergence side, d is the thickness of said single lens, N_0 is the on-axis refractive index of said single lens, and f is the focal length of said single lens.

Re. 33,228

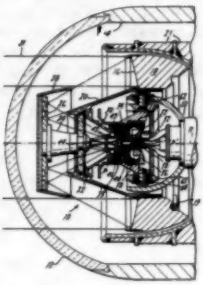
OPTICAL SCANNING APPARATUS INCORPORATING COUNTER-ROTATION OF ELEMENTS ABOUT A COMMON AXIS BY A COMMON DRIVING SOURCE

Michael E. Buchtel, Costa Mesa, and Ronald T. Honda, Irvine, both of Calif., assignors to Ford Aerospace Corporation, Detroit, Mich.

Original No. 4,427,878, dated Jan. 24, 1984, Ser. No. 319,010, Nov. 6, 1981. Application for reissue Jul. 6, 1989, Ser. No. 376,100

Int. Cl.[5] **G01J** *1/20*

U.S. Cl. 250—203.6 **10 Claims**



1. An optical scanning apparatus including:

means providing a concave primary mirror disposed to focus an image within the field of view of said primary mirror at a central optical axis;

detector means disposed on said optical axis for receiving said focused image and responsively outputting an electrical signal;

means providing a secondary mirror interconnected with and displaced from said primary mirror on said optical axis to direct said focused image towards said detector means;

means for rotating said primary and secondary mirror providing means at a first rate and direction about said optical axis;

means intermediate said secondary mirror and said detector means for optically relaying said directed focused image to said detector means; and

means connected to said providing means for responsively rotating said optical relaying means about said optical axis at a rate that is directly proportional to said first rate and in a direction that is opposite to the rotation of said rotational direction of said primary and secondary mirror providing means.

6. An apparatus as in claim **5**, *further including a flat secondary relay mirror on said optical axis,* wherein said optical relay means includes an apertured relay mirror, [a flat secondary relay mirror] and a set of relay lenses mounted on said optical axis, wherein said apertured relay mirror reflects said image from said secondary mirror means to said flat secondary relay mirror where it is focused at a point preceding said relay lenses; said relay lenses function to convey the image at said point to said detector means.

Re. 33,229

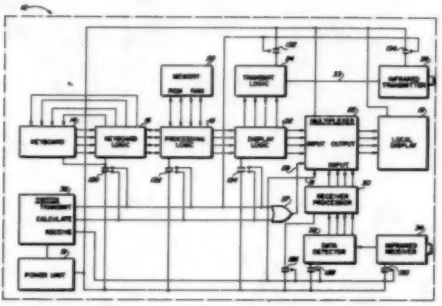
REMOTE DISPLAY DEVICE FOR A MICROCOMPUTER WITH OPTICAL COMMUNICATION

Jeffrey S. Schwaber, Maitland, Fla., assignor to C.L.I.C. Electronics International, Inc., Orlando, Fla.

Original No. 4,763,291, dated Aug. 9, 1988, Ser. No. 836,843, Mar. 6, 1986. Application for reissue Nov. 18, 1988, Ser. No. 272,950

Int. Cl.[5] **H04L** *11/02;* **G06F** *13/00*

U.S. Cl. 364—709.01 **9 Claims**



9. In an interactive data processing system comprising at least a first and a second microcomputer, each of said microcomputers having a data and a function command processing means, a keyboard for entering data and function commands into said processing means, and a display means coupled to said processing means for displaying data provided by said processing means, the improvement comprising at least first and second optical transmitting and receiving means connected to respective ones of the at least first and second microcomputers, each of the processing means being coupled to a corresponding one of said optical means for selectively transmitting and receiving data and command functions by atmospheric optical transmission between said microcomputers, each of said processing means displaying both received and transmitted data on its respective associated display means, and each of said processing means being responsive to data and command functions received via atmospheric optical transmission from the other of the processing means as though such data and command functions were entered from its respective associated keyboard.

PLANT PATENTS

GRANTED JUNE 5, 1990

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

7,240

ELM TREE NAMED GOLDEN REY ELM

Bruce Rey, Oklahoma City, Okla., assignor to Warren & Son Nursery, Oklahoma City, Okla.

Filed Mar. 3, 1989, Ser. No. 318,745

Int. Cl.[5] A01H *5/00*

U.S. Cl. Plt.—51 **1 Claim**

1. A new and distinct variety of *Ulmus parvafolia* substantially as shown and described, characterized by unusual and attractive yellow coloring of leaves that persists from early spring until the leaves drop in the autumn.

7,241

IMPATIENS PLANT NAMED ANTARES

Lyndon W. Drewlow, Ashtabula, Ohio, assignor to Mikkelsens, Inc., Ashtabula, Ohio

Filed Feb. 9, 1989, Ser. No. 308,819

Int. Cl.[5] A01H *5/00*

U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct cultivar of Impatiens plant named Antares, as illustrated and described.

7,242

SPRAY CARNATION NAMED LONGFOL

Nicole Barberet-Maiolino, and Henri Blanc, both of Antibes, France, assignors to Laboratoire de Physiologie Vegetale, La Londe-Les-Maures, France

Filed Oct. 11, 1988, Ser. No. 255,440

Int. Cl.[5] A01H *5/00*

U.S. Cl. Plt.—70 **1 Claim**

1. The new and distinctive carnation plant, substantially as herein shown and described, particularly characterized by the purple to white coloration of its flowers and the profuse production of flowers on strong, upright stems having abundant foliage.

7,243

CHRYSANTHEMUM PLANT NAMED DANA

Cornelis P. VandenBerg, Salinas, Calif., assignor to Yoder Brothers, Inc., Barberton, Ohio

Filed Apr. 28, 1989, Ser. No. 344,696

Int. Cl.[5] A01H *5/00*

U.S. Cl. Plt.—74 **1 Claim**

1. A new and distinct Chrysanthemum plant named Dana, as described and illustrated.

PATENTS

GRANTED JUN. 5, 1990

ERRATA

For CLASS	See PATENT NO.
374-170	4,930,222
475-065	4,930,372
475-128	4,930,373
225-106	4,930,385
494-070	4,930,412
606-150	4,930,502
227-178	4,930,503
137-312	4,930,549
137-334	4,930,550
137-337	4,930,551
137-362	4,930,552
137-508	4,930,553
222-325	4,930,684
222-370	4,930,685
222-394	4,930,686
222-475	4,930,687
222-484	4,930,688
222-487	4,930,689
222-490	4,930,690
223-085	4,930,692
223-066	4,930,693
224-042	4,930,694
224-257	4,930,695
224-042	4,930,696
224-275	4,930,697
296-037	4,930,737
259-105	4,930,751
269-026	4,930,831
403-024	4,930,924
404-075	4,930,935
411-014	4,930,951
414-024	4,930,958
414-546	4,931,032
047-057	4,931,061
148-248	4,931,074
204-212	4,931,166
204-284	4,931,168
204-298	4,931,169
204-418	4,931,172

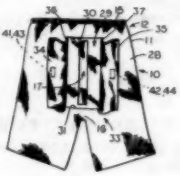
428-017 4,931,320
426-615 4,931,321
430-058 4,931,349
430-059 4,931,350
430-323 4,931,351
435-071 4,931,352
437-200 4,931,353
435-069 4,931,373
502-439 4,931,421
527-301 4,931,524
528-422 4,931,545
568-727 4,931,594
235-487 4,931,622
235-488 4,931,623
371-022 4,931,722
371-022 4,931,723
346-093 4,931,804
361-323 4,931,843
361-535 4,931,961
377-010 4,932,044
377-024 4,932,045
355-077 4,932,068
318-809 4,932,069

PATENTS

GRANTED JUNE 5, 1990

GENERAL AND MECHANICAL

4,930,161
MEDICAL EXAMINATION GARMENT
Robert A. Cohen, 2460 Peachtree Rd., Apt. 1704, Atlanta, Ga. 30305
Filed Apr. 10, 1989, Ser. No. 335,883
Int. Cl.[5] A41B *9/00*
U.S. Cl. 2—114 **7 Claims**



1. A garment adapted to be worn by a patient undergoing medical examination or treatment such as a proctological, radiological or colonoscopic examination or the like in which the patient is made to lay on his or her side, and with the garment comprising:

a trunk with front and rear portions that have a waist region;

a crotch extending between said front and rear portions and spaced from said waist region along a centerline that divides said trunk into two side halves;

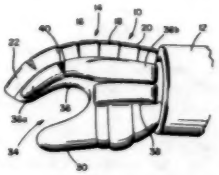
said trunk rear portion having an opening therein extending between said crotch and said waist region; and

movable rear closure means for substantially covering said rear opening, said rear closure means comprising a first flap having a size and a shape for covering and uncovering a first portion of said rear opening and a second flap having a size and a shape for covering and uncovering a second portion of said rear opening,

said first and second flaps each being foldable about a fold oriented generally parallel to and spaced from said center line for movement to a position uncovering said rear opening,

whereby the patient may undergo examination or treatment with the patient lying on his or her side and the closure means positioned uncovering the rear opening and with the crotch covering the patient's genitals.

4,930,162
HOCKEY GLOVE HAVING LATERAL PADDED WART WITH SPLIT AND FLEXIBLE INSERT
Denis Côté, St-Hyacinthe, Canada, assignor to Sport Maska Inc., St-Hyacinthe, Canada
Filed Nov. 23, 1988, Ser. No. 275,186
Int. Cl.[5] A41D *13/08, 19/00*
U.S. Cl. 2—161 A **5 Claims**



1. A protective sports glove for protecting a hand of a user, said protective sports glove comprising:

a hand receiving portion adapted to receive and enclose the hand;

respective padded finger receiving portions for receiving the forefinger, middle finger, ring finger, and pinky of the hand;

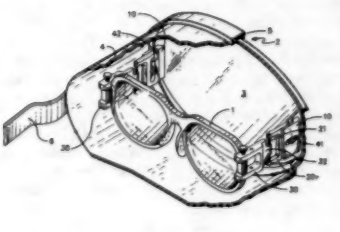
a padded thumb receiving portion for receiving the thumb of the hand;

a padded cuff portion for enclosing the wrist and lower forearm of the user;

an elongated covered and padded wart extending substantially along the length of said forefinger receiving portion and said hand receiving portion to said cuff portion and facing laterally outwardly from the forefinger receiving portion of said glove, the covering of said padded wart being split into first and second sections to allow flexibility of the glove and comfort in gripping an element; and

an elastic insert member for flexibly joining together the covering of said first and second sections of said padded wart.

4,930,163
APPARATUS FOR SUPPORTING AN EYEGLASS FRAME LENS ASSEMBLY IN A DIVING OR PROTECTIVE MASK
Mathew B. King, 19011 East Mansfield Drive, Aurora, Colo. 80013
Filed Dec. 15, 1988, Ser. No. 284,909
Int. Cl.[5] A61F *9/02*
U.S. Cl. 2—444 **41 Claims**



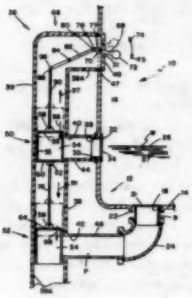
1. An apparatus for supporting a frame-lens assembly of a conventional pair of eyeglasses, having right and left temple portions, within a face mask for a period of temporary use in combination with the mask wherein the mask has a viewing window and a tubular shroud including a first surrounding edge that surrounds the viewing window and a second surrounding edge spaced from the first surrounding edge to form a surrounding sidewall, the eyeglass supporting apparatus comprising:

left and right support members;

left and right pivotal attachment means for pivotally attaching the left and right temple portions of the eyeglass frame assmbly to said left and right support members respectively;

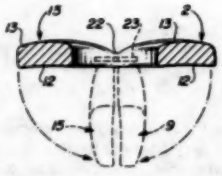
means for rotationally biasing said support members outwardly and away from one another to urge said left and right support members into abutting relation to the shroud and to the viewing window, thereby causing the eyeglass frame assembly to be supported in a functional position within the mask.

4,930,164
DOUBLE DRAIN
Robert L. Gibson, 5471 Homestead La., Bay City, Mich. 48706
Filed Feb. 13, 1989, Ser. No. 309,704
Int. Cl.[5] E05C 1/22
U.S. Cl. 4—199 23 Claims



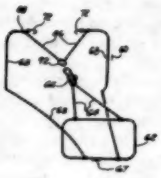
1. Drain apparatus comprising:
generally vertical drainpipe means including a cylindrical sidewall defining a vertical drain passage;
said sidewall including upper and lower openings therein;
a first conduit coupled to said drainpipe means for communicating liquid to said lower opening;
a second conduit coupled to said drainpipe means for communicating liquid to said upper opening;
a first valve mounted in said vertical drain passage for vertical reciprocal movement between a stopping position, aligned with said lower opening, interrupting the flow of liquid from said first conduit to said vertical drain passage, and a vertically spaced, draining position allowing the flow of liquid from said first conduit to said vertical drain passage;
a second valve mounted in said vertical drain passage for vertical reciprocal movement between a stopping position, aligned with said upper opening, interrupting the flow of liquid from said second conduit to said vertical drain passage, and a vertically spaced non-blocking position allowing the flow of liquid from said second conduit to said vertical passage; and
means for moving said first valve in said vertical passage between said stopping position and said draining position and for concurrently moving said second valve in said vertical passage between said blocking position and said non-blocking position.

4,930,165
FOLDING COMMODE SEAT
Arlon R. Wilson, 1216 Norris Dr., Bossier City, La. 71111
Filed Oct. 27, 1988, Ser. No. 263,237
Int. Cl.[5] A47K 13/02
U.S. Cl. 4—235 2 Claims



1. A folding commode seat for removably mounting on a conventional commode seat, comprising a pair of substantially symmetrical panel segments foldable against each other and shaped to fit on the conventional commode seat, said panel segments being vinyl coated foam material a bendable plastic hinge embedded in said foam material of said panel segments for selectively folding said panel segments and unfolding said panels segments for deployment on the conventional commode seat and at least one panel strap carried by said panel segments for securing said panel segments to the conventional commode seat, said panel strap further comprising a strap loop attached to one end of said panel strap and a plurality of loop and pile fasteners provided on the opposite end of said panel strap, whereby said opposite end of said panel strap is looped beneath the conventional commode seat and extended through said strap loop and said loop and pile fasteners are then engaged, to secure said folding commode seat on the conventional commode seat.

4,930,166
TOILET LID SAFETY RESTRAINT
Jan Salloum, 830 E. Beach Blvd., Long Beach, Miss. 39466
Filed May 23, 1989, Ser. No. 355,926
Int. Cl.[5] A47K 13/00
U.S. Cl. 4—253 8 Claims

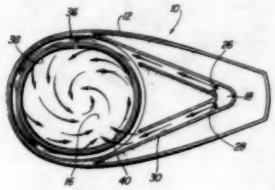


1. An apparatus for removably securing the lid of a toilet against the bowl thereof comprising:
a first girth strap circumferentially surrounding a forward portion of a toilet;
a second girth strap circumferentially surrounding a rearward portion of said toilet;
means for adjoining said first and said second girth straps proximate a lower portion thereof;
a first bridle strap extending from spaced apart points upon an upper portion of said first girth strap;
a second bridle strap extending from spaced apart points upon said second girth strap;
means for removably affixing said first bridle strap to said second bridle.

4,930,167
TOILET WITH VORTEX FLUSHING ACTION
Myron J. Ament, Plano, Tex., assignor to Household Manufacturing, Inc., Prospect Heights, Ill.
Filed Sep. 26, 1988, Ser. No. 249,513
Int. Cl.[5] E03D 11/08
U.S. Cl. 4—420 21 Claims

1. A one-piece molded toilet comprising:
a bowl;
a rim feed reservoir integral with said bowl and operative to connect said bowl with an external water supply source;
a rim integral with said bowl and extending generally around the periphery of said bowl, said rim defining an internal rim cavity;
a continuous rim discharge passage provided on the underside of said rim within said bowl; and
passage means for producing vortex flushing within said bowl, said passage means including at least two flow passages fluidly connected between said rim feed reservoir and said internal rim cavity, said passage means, rim feed reservoir, and said rim and bowl being of a one-piece

molded construction, said first flow passage diameter being different than the diameter of said second flow passage and wherein said first flow passage provides fluid communication between one side of said rim cavity and said rim feed reservoir in a first direction, and said second



flow passage providing fluid communication between an opposite side of said rim cavity and said rim feed reservoir in a second direction such that fluid discharged through said rim discharge passage into said bowl generates top to bottom swirling fluid motion in said bowl.

4,930,168

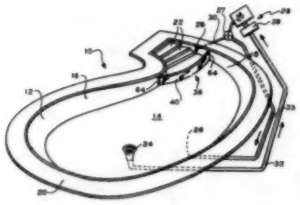
SWIMMING POOL WITH CONVERTIBLE HOT TUB

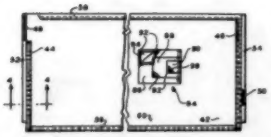
Victor J. Ferlise, 254 S. Shore Dr., Toms River, N.J. 08753

Filed May 30, 1989, Ser. No. 358,125

Int. Cl.[5] E04H *3/18*

U.S. Cl. 4—489 **20 Claims**





1. A swimming pool-hot tub combination comprising:

a water tank;

a water inlet connected to said tank at a first location;

means connected to said inlet and said outlet for removing water from said second location via said outlet, for heating the water, and for supplying the heated water at a first rate to said first location via said inlet; and

a barrier having means removably mounting said barrier in said tank for selectively dividing said tank into a pool area including said second location and a hot tub area including said first location to permit one-way free flow of water from said hot tub area directly into said pool area while preventing the flow of water from said pool area directly back into said hot tub area so that a continuous flow of hot water from said hot tub area can flow directly into a pool of cooler water in said pool area.

8. A swimming pool-hot tub combination comprising:

a water tank;

a water inlet connected to said tank at a first location;

a water outlet connected to said tank at a second location;

means connected to said inlet and said outlet for removing water from said second location via said outlet, for heating the water, and for supplying the heated water at a first rate to said first location via said inlet; and

barrier means including a flexible sheet and fastening means for removably fastening said sheet to said tank for selectively dividing said tank into a pool area including said second location and a hot tub area including said first location, and for permitting water to flow from said tub area directly to said pool area at a rate no greater than said first rate, wherein said fastening means includes a slotted channel joined to said tank and an enlarged rib formed on said sheet whereby said rib is slidably received in said channel for mounting said sheet, and wherein said barrier means further includes water temperature control means comprising an opening formed in said sheet and a flap means for variably and selectively covering said opening for permitting selectiv adjustment of the rate of heat flow from said tub area to said pool area.

4,930,169

APPARATUS FOR PATIENT HYDROTHERAPY AND MANIPULATIVE TREATMENT BY A THERAPIST

Kenneth Davison, 7782 Houston Road, Eaton Rapids, Mich. 48827

Filed Dec. 27, 1988, Ser. No. 290,426

Int. Cl.[5] A47K *3/00*

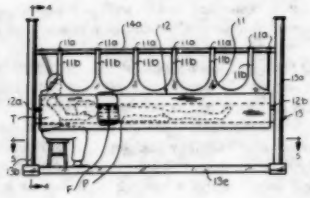
U.S. Cl. 4—559 **19 Claims**

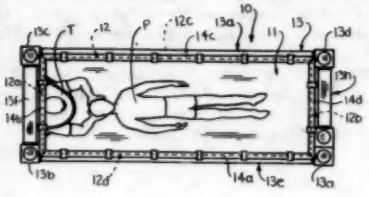
1. An apparatus for treating a patient with a fluid and for manipulation of the patient by a therapist in the fluid which comprises:

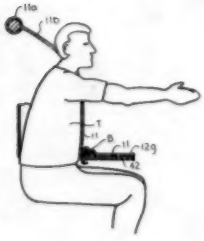
(a) support means having a depth, length and width so as to provide an enclosure which accommodates the patient in the support means, wherein the support means has at least one segment which provides an opening so that a therapist can position an upper body portion within the enclosure of the support means in a standing or sitting position with the arms of the therapist in contact with the patient; and

(b) a fluid impermeable liner supported by the support means

so as to provide the fluid around the patient, wherein the liner covers the segment and in use the liner is pushed







away from the segment into the enclosure by the body of the therapist.

4,930,170

FOLDABLE AND TRANSFORMABLE THICK MAT

Kouichi Kobayashi, Fukui, Japan, assignor to Maruichi Selling Kabushiki Kaisha, Imadate, Japan

Filed Nov. 9, 1987, Ser. No. 118,466

Claims priority, application Japan, May 22, 1987, 62-126722

Int. Cl.[5] A47C *17/04, 27/22*

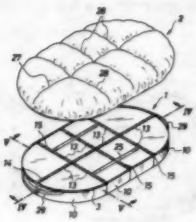
U.S. Cl. 5—12 R **4 Claims**

1. A foldable and transformable thick mat comprising:

a cushion base including a plurality of juxtaposed block segments each having a predetermined cushion property and thickness, said block segments being connected together at adjacent upper surfaces thereof, and movably foldable about a centrally disposed longitudinal fold line and a plurality of parallel transverse fold lines intersecting said longitudinal fold line, said fold lines being formed by slots which facilitate separation of the segments when folded;

a cushion member covering the upper surfaces of the cushion base segments and having a longitudinal fold line and plural transverse fold lines positionally corresponding to the fold lines of the cushion base when the cushion member is placed on the cushion base; and

connecting means for detachably connecting the cushion base and the cushion member without inhibiting transformation of the mat into various shapes by folding the cushion base and cushion member along the fold lines.



4,930,171

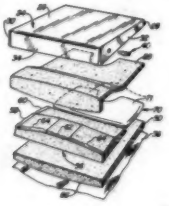
CONTOUR RETAINING SUPPORT CUSHION

Ronald F. Frantz, Barrington, Ill., assignor to International Healthcare Products, Inc., Northbrook, Ill.

Filed May 3, 1989, Ser. No. 347,170

Int. Cl.[5] A47C *27/18, 1/00*

U.S. Cl. 5—450 **33 Claims**



1. A support cushion for a seated human body comprising:

a flexible, airtight casing having at least a top support layer and a bottom bearing layer, said casing having a forward region to be disposed under the body's thighs and a rearward region to be disposed under the body's buttocks;

valve means mounted to said casing for communicating with the interior of said casing and operable for preventing or permitting flow of air through said valve means into and out of said casing;

a bottom layer of resilient foam material positioned on said casing bottom bearing layer and extending into said forward and rearward regions of said casing;

a fluid-filled pad positioned on top of a portion of said bottom layer of resilient foam material in said rearward region of said casing, said pad extending rearwardly from said forward region in a configuration defining a void over which the seated body's sacral area and coccyx can be disposed and defining lateral portions on bolt lateral sides of said void over which the seated body's ischial tuberosity area can be disposed;

a forward mass of resilient foam material extending forwardly of said pad in said casing forward region over which the seated body's thighs can be disposed; and

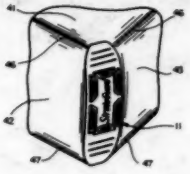
a top layer of resilient foam material disposed to extend over said forward mass of resilient foam material and said pad, said top layer of resilient foam material extending into said rearward region of said casing in a configuration defining a top layer void defining top layer lateral portions on both sides of said top layer void, said top layer lateral portions being generally in registry with said pad lateral portions to generally register said top layer void with said pad void.

4,930,172

WATERBED CORNER STRUCTURE AND METHOD

John B. Johnsting, Beverly Hills, Calif., assignor to Strata Flotation, Inc., Beverly Hills, Calif.

Filed Aug. 18, 1989, Ser. No. 395,715
Int. Cl.[5] A47C 27/08, 31/00
U.S. Cl. 5—451 8 Claims



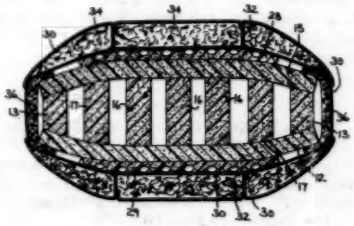
1. In a cornerpiece for a waterbed mattress: a base plate having generally planar front and rear surfaces and a peripheral sealing area for attachment to the walls of the mattress, a plurality of ridges projecting from the front surface for engagement with a bedsheet to help retain the bedsheet on the mattress, said base plate and said ridges being formed as a monolithic structure of a material which is pliant enough to conform to the contour of the mattress and tough enough to resist puncturing.

4,930,173

CUSHION ELEMENT AND METHOD FOR MAKING SAME

Thomas A. Woller, Jamestown, N.C., assignor to Baker, Knapp & Tubbs, Inc., Chicago, Ill.

Filed Jul. 3, 1989, Ser. No. 374,888
Int. Cl.[5] A47C 27/14
U.S. Cl. 5—481 5 Claims



1. An outwardly crowned cushion element adapted to be the support surface of a chair or the like, thereby supporting a seated user, comprising:

a foam box having a top wall, a bottom wall, and two opposed generally parallel side walls of substantially equal height, and further side walls, which together with said two opposed side walls form a substantially closed foam perimeter, said walls defining an internal cavity;

a plurality of elongate foam support slabs positioned in the cavity and extending between and generally parallel with the opposed side walls, said slabs being in contact with both an inside surface of the bottom wall and an inside surface of the top wall;

said slabs also being spaced sufficiently from one other in at least part of the cavity so that they remain separated from one another under normal compression caused by a seated user; and

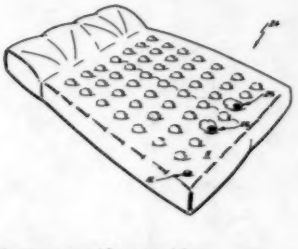
at least one of the slabs in a central area of the cavity having a greater relaxed state height than the relaxed state height of said two opposed side walls, wherein the walls and slabs are juxtaposed such that at least one slab causes an outward crowning in the cushion element.

4,930,174

PUMP ASSEMBLY FOR AIR MATTRESS

Murray Hunter, Balmain, Australia, assignor to Jackel International Pty. Ltd., Rydalmere, Australia

Filed Jun. 15, 1988, Ser. No. 206,745
Claims priority, application Australia, Jun. 16, 1987, PI2508
Int. Cl.[5] A47C 27/08; F04B 43/00
U.S. Cl. 5—454 8 Claims



1. A fluid pump assembly comprising:

an envelope of generally flexible sheet material enclosing a chamber which can be varied in volume;

resilient means located in said chamber so as to bias said envelope to occupy a configuration maximizing said volume, said volume being reducible by the pressure of the hand or foot of an operator at an optimum location on the exterior of said envelope;

outlet duct means extending from said chamber;

a one-way valve in said outlet duct means to restrict the flow of fluid through said outlet means from said chamber to exhaust to the exterior of said chamber; and

inlet duct means extending into said chamber to allow fluid to be drawn into said chamber from the exterior thereof, said inlet duct means being substantially unobstructed to the flow of air therethrough into said chamber during a pumping operation and having an unobstructed inlet opening on the exterior of said chamber constructed and arranged to be closed by the hand or foot of an operator during an application of pressure at said optimum location on the exterior of said envelope,

whereby on application of such pressure, fluid in said chamber is compressed and forced to exhaust to the exterior of said envelope through said outlet duct means and said one-way valve and on relief of such pressure by the lifting of the hand or foot of the operator, said inlet opening is opened, the volume of said chamber expands and air is drawn substantially unobstructedly into said chamber through said inlet duct means.

4,930,175

WATER-PROOF SNOW BOOT

Chin-Lung Chen, No. 30, Thai Yuan Road Sec. 1, West Dist., Taichung, Taiwan, assignor to Chin-Lung Chen, Taichung, Taiwan and Arthur Joseph Colpack, Boston, Mass.

Filed Feb. 3, 1989, Ser. No. 305,979
Int. Cl.[5] A43B 10/00, 1/14, 5/00
U.S. Cl. 12—142 R 2 Claims

1. An improved process of manufacturing a water proof snow boot comprising:

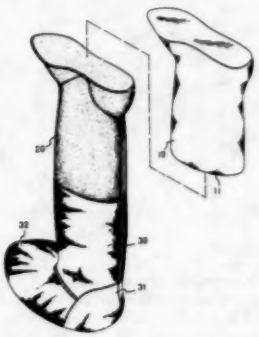
inserting an inner lining into a water proof plastic intermediate member with a shoetree; binding rims of openings of said lining and intermediate member together by an adhesive material;

putting a shoetree into said inner lining and adding heat from outside of said intermediate member to firmly bind them together;

seaming the rim of a top opening of an outer leather covering with the rim of the opening of said inner lining with the inside of the outer leather covering turned out and disposed in head to head connection with said inner lining;

attaching an inner surface of said outer leather covering which covers a back of a foot with thermo-adhesive strips and fixing a hell member with glue to an inner heel portion;

overturning said inside-out leather covering to cover all surfaces of said intermediate member;



heating the surface of said leather covering to melt said thermo-adhesive strips thereon so that said outer leather covering and said intermediate member is firmly joined together;

attaching a midsole to a bottom of said intermediate member with glue;

adhering an open-bottomed periphery of the leather covering to the midsole underside; and

attaching an outer sole to a bottom of said midsole to complete production of the snow boot.

4,930,176

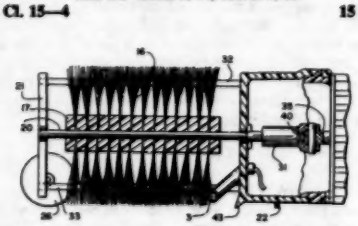
COMBINATION HEATED SCRAPER AND BRUSH

Gideon Gelman, 211 E. Ohio, Apt. 1201, Chicago, Ill. 60611

Filed Jul. 21, 1989, Ser. No. 383,920

Int. Cl.[5] B60S *1/04*; A47L *1/05*

U.S. Cl. 15—4 **15 Claims**



1. A device for cleaning ice and snow from a surface comprising:

a frame structure;

a sweeping member mounted with respect to said frame for rotational movement to remove snow or ice from a surface;

a scraping member connected to said frame and subtending said sweeping member for directly contacting and loosening the snow and ice remaining on said surface after operation of said sweeping member;

a heating element connected to said frame positioned in proximate relation to said scraping member for softening the snow and ice prior to the contact by said scraping member; and

base means connected to said frame and including means to power said heating element and said sweeping element.

4,930,177

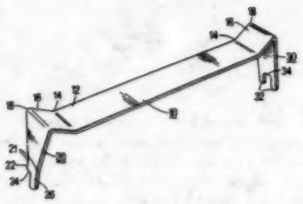
SCRAPER FOR THE FRICTION SEAL OF PAINT CANS

John F. Rastutis, 4625 Vista St., Long Beach, Calif. 90803

Filed Aug. 23, 1989, Ser. No. 397,235

Int. Cl.[5] B44D *3/16*

U.S. Cl. 15—105 **5 Claims**



1. An integrated, hand-held tool for scraping the surfaces of a paint can friction seal between the can rim and the lid of the can, comprising:

(a) friction seal scraping means for cleaning selected surfaces of said can rim and friction seal scraping means for cleaning selected surfaces of said lid,

(b) a handle comprised of a rectangular, planar segment

(c) an upwardly inclined planar segment disposed at each end of said handle, each said inclined segment adapted to receive the thumb of the hand,

(d) a downwardly inclined planar segment continuing from each said upwardly inclined planar segment, and

(e) said friction seal scraping means for said can rim being disposed at the end of one of said downwardly inclined planar segments and said friction seal scraping means for said lid being disposed at the end of the other of said downwardly inclined planar segments.

4,930,178

COMPACT SELF-CONTAINED RECYCLING EXTRACTION CLEANER

Clifford L. Monson, 1765 Ala Moana Blvd., Unit 280, Honolulu, Hi. 96815; Danny C. Perry, 129 Polihale Pl.; Theodor Domay, 146 Polihale Pl., both of Honolulu, Hi. 96825, and Henry A. Wilks, 115 Alkapa Pl., Kailua, Hi. 96734

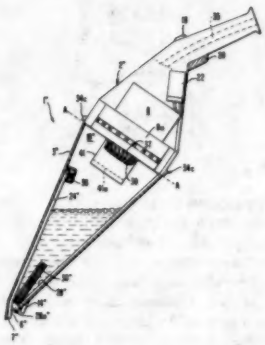
Filed Jul. 17, 1985, Ser. No. 755,796

Int. Cl.[5] A47L *5/24*

U.S. Cl. 15—320 **12 Claims**

1. A compact, self-contained extraction cleaner for applying cleaning fluid to any surface of variable orientation to be cleaned and for picking up fluid and other material from said surface by a vacuum action comprising a body member having a handle section and a discharge head section removably connected at a first end to said handle section, said discharge head section having a closed second end opposite to said first end and being formed to provide a single chamber open only at said first end, said single chamber including a fluid receiving portion at the closed, second end and a plenum portion at the first end, said single chamber being opened for the receipt of cleaning fluid through said open first end of said discharge head section by the removal of said discharge head section from said handle section, a fluid delivery pump means mounted within said body member, first fluid conduit means mounted within said body member and extending between said fluid receiving portion and said fluid delivery pump means, a vacuum intake means formed adjacent to the second end of said discharge head section, vacuum conduit means connecting said vacuum

intake means to said plenum portion, nozzle means mounted at said second end of said discharge head section and spaced relative to said vacuum intake means, said nozzle means being operative to apply cleaning fluid to said surface to be cleaned when said nozzle means is directed toward said variably oriented surface, second fluid conduit means mounted on said body member and extending between said nozzle means and said fluid delivery pump means, said fluid delivery pump means operating to draw cleaning fluid from said fluid receiving portion through said first fluid conduit means and to deliver cleaning fluid under pressure through said second fluid conduit means to said nozzle means, the handle section of said body member containing liquid affected electrical components



including a vacuum motor and a vacuum blower means driven by said vacuum motor and having an intake side positioned to permit said vacuum blower means to create a vacuum in said plenum section when said handle section and discharge head section are connected together, and a centrifugal separator means mounted to be driven by said vacuum motor, said centrifugal separator means being mounted at a first end of said handle section and operating to extract fluid from the air reaching said vacuum blower means and vacuum motor when said discharge head section is connected to said handle section, said handle section including an elongated handle extending from a second end of said handle section opposite said first end thereof.

4,930,179

DECORATING TOOL

Paul B. Wright, Lower Earley, and Mary V. Ward, London, both of England, assignors to Imperial Chemeical Industries, plc, London, England

Filed Aug. 4, 1988, Ser. No. 228,277

Claims priority, application United Kingdom, Aug. 5, 1987, 8718532; Apr. 19, 1988, 8809173

Int. Cl.[5] B05C *17/02*

U.S. Cl. 15—230.11 **15 Claims**

1. A decorating tool suitable for use in providing a flowable surface-coating having a broken pattern and applied to a surface, which tool comprises:

a roller,

a plurality of flexible, water-permeable flaps, the flaps extending in a direction inclined at an angle of from 0° to 50° to the axis of the roller and each flap having a proximal end and a distal end, and

means which attach the proximal end of each flap to the roller.

4,930,180

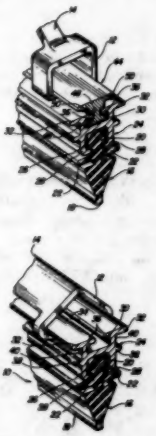
WINDSHIELD WIPER BLADE

Rodney K. Longman, Boca Raton, Fla., assignor to Pylon Manufacturing Corporation, Deerfield Beach, Fla.

Filed Jun. 10, 1988, Ser. No. 205,144

Int. Cl.[5] B60S *1/04*

U.S. Cl. 15—250.42 **10 Claims**



1. A windshield wiper blade adapted to be interchangeably attached to a pressure-distributing superstructure having a spaced apart plurality of claws, said wiper blade comprising:

a flexible windshield wiping element;

an elongated backing member retaining said wiping element, said backing member having an elongated slot open to the top of said backing member and a pair of upper flanges extending laterally outwardly in opposite directions; and

an elongated adapter having an elongated flange formed at the lower end thereof and a pair of upper flanges extending laterally outwardly in opposite directions, said lower elongated flange selectively receivable within said elongated slot of said backing member to selectively mount said adapter to said backing member;

said upper flanges of said backing member having a first width for engaging the claws of a superstructure and said upper flanges of said adapter having a second width for engaging the claws of another superstructure, said adapter selectively mountable to said backing member whereby said windshield wiper blade may be selectively attachable to different pressure-distributing superstructures.

4,930,181

AUXILIARY TOOL HANDLE

Samuel V. Johnson, 32 Cherry Tree Rd., Loudonville, N.Y. 12211

Filed May 31, 1988, Ser. No. 200,451

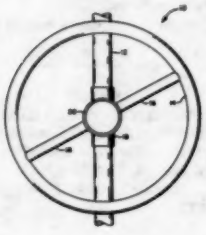
Int. Cl.[5] B25G *1/10*

U.S. Cl. 16—110 R **2 Claims**

1. A tool handle assembly, comprising:

a plurality of curvilinear handle segments removably attachable to a substantially straight tool handle; and

means for varying the position of said curvilinear handle segments about the circumference and along the longitudinal axis of said straight tool handle,



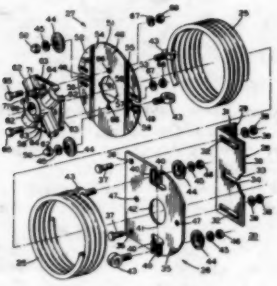
said curvilinear handle segments in assembly describing a figure eight and said position varying means comprising a sleeve for receiving a portion of the straight tool handle for slidable mounting thereon and adjustable sleeve fastening means.

4,930,182

APPARATUS FOR COUNTERBALANCING AN OVERHEAD DOOR

William A. Eichenberger, Toledo, Ohio, assignor to Apco Power-Unit Corporation, Toledo, Ohio

Filed Apr. 14, 1989, Ser. No. 339,117
Int. Cl.[5] E05F *1/08*
U.S. Cl. 16—198 **18 Claims**



1. In an apparatus for counterbalancing an overhead door including a shaft rotatably mounted on a building wall above a door opening, a pair of winding drums mounted on the shaft and connected to the door by cables, and a torsion spring, means for attaching the spring to the shaft and to the wall comprising:

a spring winding assembly having adjustable attachment means for coupling to one end of a torsion spring and having releasable attachment means for coupling to a shaft and including a spring winding plate having said adjustable attachment means formed thereon;

said adjustable attachment means including a pair of generally radially extending slots formed in said spring winding plate and a pair of eye bolts, each of said eye bolts having an apertured head for receiving a coil at the one end of the torsion spring and having a threaded shank extending through an associated one of said slots and engaging a nut, said eye bolt being moveable in said slots to accommodate the diameter of the coil of the torsion spring; and

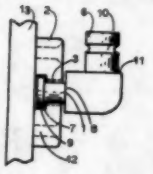
a spring anchor assembly having adjustable attachment means for coupling to the other end of the spring and means for attachment to a building wall, said adjustable attachment means both accommodating torsion springs of different diameters.

4,930,183

CANOPY-SUPPORT HINGE DEVICE

T. Douglas Owens, 108 Shepherd Trail, Longwood, Fla. 32750

Filed Sep. 26, 1988, Ser. No. 248,933
Int. Cl.[5] E05D *7/00*
U.S. Cl. 16—260 **16 Claims**



1. A canopy-support hinge comprising:

a canopy-support hinge base;

a canopy-support hinge bolt having two oppositely-disposed sides uniformly flat with a selective distance between them and parallel to the axis of the bolt;

a cylindrical hinge-bolt aperture in the hinge base;

a linear open edge of the hinge-bolt aperture with an orifice wide enough to allow entry of the hinge bolt linearly at the parallel sides but not wide enough to allow the hinge bolt to pass through the said orifice when the hinge bolt is rotated to a position in which the parallel flat sides of the hinge bolt are not tangentially in line with the linear open edge;

a flanged bolt head selectively larger than the diameter of the hinge bolt at one end of the hinge bolt; and

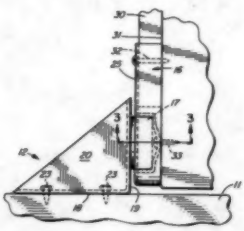
a means for attachment of the bolt to a tubular end of a canopy-support member at the opposite end and perpendicular to the axis of the hinge bolt from the flanged head said attachment means includes a rod whereby the rod matingly fits inside the tubular end.

4,930,184

HINGE ASSEMBLY FOR CONNECTING A FLOAT TO A BASE

Donald J. Kristmanson, 7349 Ridge, Burnaby, British Columbia, Canada (V5A 1R5)

Filed Dec. 16, 1988, Ser. No. 285,598
Int. Cl.[5] E05D *11/08*
U.S. Cl. 16—273 **18 Claims**



1. A hinge assembly for connecting a marina float to a base, comprising means for connecting the marina float to the base, the means including:

(a) a male member means connected to one of the base and the float having a cylindrical, outwardly-extending boss;
(b) a female member means connected to the other of the base and the float having a cylindrical, inwardly-extending recess;
(c) a resilient bearing sleeve means encircling and engaging the outer circumference of the boss, said sleeve being of a thickness to fit between the boss and the recess to rotatably attach the recess about the outer circumference of the sleeve.

4,930,185

WINDOW STAY CAP MEMBER

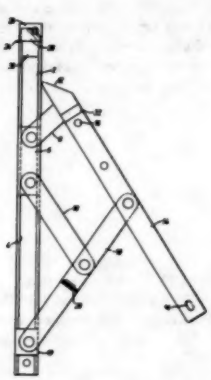
Melvin Hutton, Braintree, England, assignor to Cego Limited, Essex, England

Filed Dec. 22, 1988, Ser. No. 290,238

Claims priority, application United Kingdom, Dec. 24, 1987, 8730176

Int. Cl.[5] E05D *11/10*

U.S. Cl. 16—325 **9 Claims**



1. A cap member for a window stay including a bar which is adapted to be secured to a frame member of an openable window vent, said bar having a longitudinal axis and one end which is arranged to be received in said cap member when said window vent is closed, and said one end having a tip and at least one edge inclined relative to the longitudinal axis of said bar whereby said one end is tapered to said tip thereof, said cap member comprising means defining a recess to receive said tapered end, and a pawl pivotably mounted to turn about a pivot axis, said pawl having a surface defining an internal cam surface of said recess which is adapted to engage said tip of said bar when said tapered end enters said recess upon closure of said window vent, and inner and outer edges disposed at opposite ends of said pawl surface such that said inner and outer edges lie on opposite sides of a plane which includes said pivot axis and is normal to said pawl surface, said pawl being arranged such that both said inner edge and said (tip) outer edge of said pawl engage and bear against said inclined edge of said tapered end of said bar when said window vent is in the closed position.

4,930,186

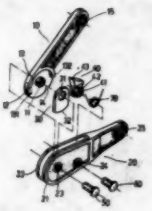
SUITCASE PIVOTING ARM

Shwu-Guei Liuwu, No. 28, Ta Ma Road, Chung San Tsun, Wai Pu Hsiang, Taichung Hsien, Taiwan

Filed Feb. 6, 1989, Ser. No. 306,756

Int. Cl.[5] E05D *11/10*

U.S. Cl. 16—325 **6 Claims**



1. A suitcase pivoting arm comprising:
an upper arm member;
a lower arm member;
an actuating plate;
a mating block;
axle pins; and
a spring;
said upper and lower arm members being pivotally connected with said actuating plate at first ends thereof by an axle pin wherein said actuating plate freely rotates around the axle pin;
said upper arm member including a round plate shaped front end with an inner lug, an outer lug and one or more notches formed therearound, said mating block being pivotally connected to said lower arm member and the top end of said mating block being forced by said spring into contact with the periphery of said round plate shaped front end of said upper arm member;
whereby upon rotation of said upper and lower arm members in an outward direction, said mating block is set in said notch of said round plate shaped front end of said upper arm member and said upper arm member is protected from reverse rotation so as to support the lifted suitcase cover;
said upper and lower arm members being continuously extendable outward to a predetermined angle, wherein said outer lug of said round plate shaped front end of said upper arm member drives said actuating plate to push said mating block away from said notch so as to enable said upper and lower arm members to pivot with respect to each other and to allow the suitcase cover to be closed; and
at the time the suitcase is closed to within a predetermined angle, said inner lug of said round plate shaped front end of said upper arm member drives said actuating plate to break away from said mating block, thereby enabling said mating block to return to an original position in contact with the periphery of said round plate shaped front end of said upper arm member, the pivoting arm thus being ready for a subsequent operation to support the lifted suitcase cover.

4,930,187

METHOD AND APPARATUS FOR SPLITTING CHICKEN WINGS

Jackie T. Whittington, Purlear, N.C., assignor to Holly Farms Foods, Inc., Wilkesboro, S.C.

Filed Jun. 29, 1989, Ser. No. 373,896

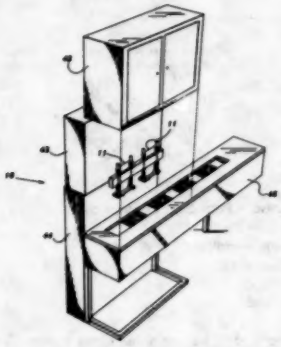
Int. Cl.[5] A22C *21/00*

U.S. Cl. 17—11 **15 Claims**

1. An apparatus for splitting the mid-joint portion of a chicken wing that has been previously separated from the tip

portion and the drumette portion into two individual pieces each formed of one of the longitudinally extending parallel bones and associated meat portions, the apparatus comprising:

splitting means comprising a blade for splitting a mid-joint portion of a chicken wing that has been previously separated from the tip portion and the drumette portion between the longitudinally extending parallel bones therein while substantially avoiding cutting the bones or removing meat from the bones;



a plurality of mid-joint carriers on a horizontaly moving conveyor for receiving a plurality of mid-joint portions at a location spaced from said splitting means and for moving the mid-joint portions into a generally perpendicular position with respect to said splitting means; and wherein each said carrier is sized to position and carry one individual mid-joint portion of a chicken wing; and

means associated with said splitting means for contacting and stabilizing a mid-joint portion while said splitting means splits the mid-joint portion.

4,930,188

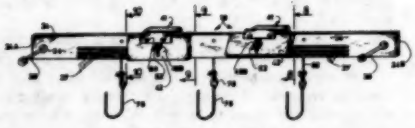
SPORTSMAN'S GAME AND FISH CLEANING STATION

Silas G. Hyde, Rte. 4, Box 162, Paragould, Ark. 72450

Filed Sep. 25, 1989, Ser. No. 411,897

Int. Cl.[5] A22B *1/00*

U.S. Cl. 17—44.3 **23 Claims**



1. A game and fish cleaning station comprising:

elongated support bar means adapted to be generally horizontally disposed and supported above ground at a desired height for suspending a game animal to be cleaned;

clamping means associated with said support bar means for forcibly clamping at least a portion of said game animal against said support bar means to support the animal during subsequent cleaning, skinning, gutting or the like, said clamping means comprising:

clamping plate means adapted to be selectively compressed against said support bar means; and,

hinge means for pivotally mounting said clamping plate means relative to said support bar means.

4,930,189

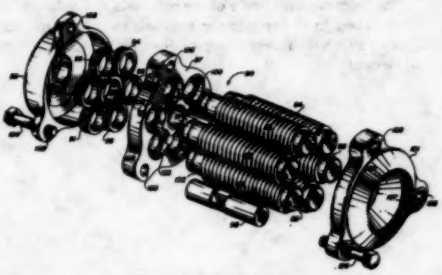
DYNAMIC SCREENER

Sylvester L. Woodland, 975 McKinley Dr., Blackfoot, Id. 83221

Filed Mar. 31, 1989, Ser. No. 331,227

Int. Cl.[5] A22C *25/16*

U.S. Cl. 17—46 **20 Claims**



1. A dynamic screen for removing cartilege, gristle and bone fragments from a soft pliable meat product comprising:

at least a pair of rotating cylinders each having a helically corrugated surface,

said cylinders being arranged about a central opening in a parallel orientation to form a constant fixed space between said cylinders as they rotate,

said cylinders being rotated in the same direction,

whereby when said soft pliable meat product passes between said cylinders any cartilege, gristle and bone fragments of said product too large to pass through said space are retained by the cusp formed by said cylinders and moved to one end thereof by ridges of said corrugated surface for removal thereof.

4,930,190

APPARATUS FOR FEEDING A FIBER LAP TO A FIBER PROCESSING MACHINE

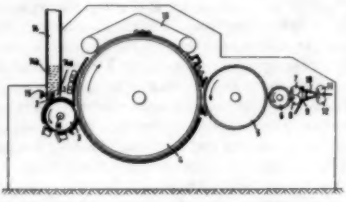
Ferdinand Leifeld, Kempen, Fed. Rep. of Germany, assignor to Trützschler GmbH & Co. KG, Monchen-Gladbach, Fed. Rep. of Germany

Filed Oct. 3, 1988, Ser. No. 261,519

Claims priority, application Fed. Rep. of Germany, Oct. 5, 1987, 37336320

Int. Cl.[5] D01G *15/40*

U.S. Cl. 19—105 **10 Claims**



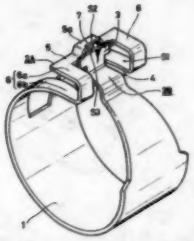
10. A textile fiber processing assembly as defined in claim 8, wherein said feed roller is mounted on said lower terminal length portion, whereby said feed roller is displaceable as a unit with said lower terminal length portion.

4,930,191

HOSE CLAMP

Yasuo Takahashi, and Toshinari Hojima, both of Yokohama, Japan, assignors to Kato Hatsujo Kaisha, Ltd., Kanagawa, Japan

Filed Jun. 9, 1989, Ser. No. 363,988
Claims priority, application Japan, Jul. 4, 1988, 63-88040
Int. Cl.[5] B65D 63/02
U.S. Cl. 24—20 R 1 Claim



1. A hose clamp comprising:

an annular clamp body having a first terminal portion and a second terminal portion;

said first terminal portion comprising side walls, a guide opening defined between said side walls, a leading end, and a lock wall defined between said guide opening and said leading end, said lock wall having a protruding central portion, said protruding central portion having a notch therein, and said side walls bending back over themselves defining a substantially U-shaped portion having an upper portion and a lower portion;

said second terminal portion comprising an engaging tongue piece for abutting said lock wall to maintain said annular clamp body in a radially expanded state, said engaging tongue piece defined by a wall bent radially outwardly with respect to said annular clamp body;

said upper and lower portions defining therebetween a first space for permitting insertion of a tool from forward and rear sides of said annular clamp body, a lower surface of said protruding central portion and an upper end surface of said engaging tongue piece defining therebetween a second space for permitting insertion of a tool from opposite lateral sides of said annular clamp body when said engaging tongue piece abuts against said lock wall to maintain said annular clamp body in a radially expended state, and said notch and a forward surface of said engaging tongue piece defining therebetween a third space for permitting insertion of a tool from a top side of said clamp body when said engaging tongue piece abuts against said lock wall to maintain said clamp body in a radially expanded state;

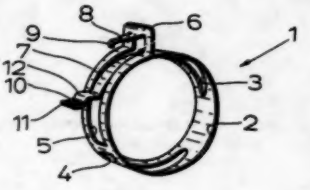
whereby when said annular clamp body is in a radially expanded state, said annular clamp body can be contracted for clamping a hose by releasing the abutting relation between said engaging tongue piece and said lock wall by operating a tool from any one of the forward, rear, laterally opposite, and top sides to move said engaging tongue piece within said guide opening.

4,930,192

HOSE CLAMP

Rudolf Muhr, Attendorn, Fed. Rep. of Germany, assignor to Muhr und Bender, Attendorn, Fed. Rep. of Germany

Filed May 4, 1989, Ser. No. 347,295
Claims priority, application Fed. Rep. of Germany, Sep. 28, 1988, 3832875
Int. Cl.[5] B65D 63/02
U.S. Cl. 24—20 R 7 Claims



1. A hose clamp having a resilient clamp body and a first tightening end and a second tightening end, said tightening ends overlapping each other, said tightening ends being bent substantially radially away from said clamp body;

said clamp body being adapted and constructed to have a certain inside diameter in the clamping state and being able to be spread apart to a considerably greater diameter counter to its own spring force in the spread-apart state;

said first tightening end being in the shape of an inverted U;

said second tightening end being in the form of a protrusion, said second tightening end being disposed between the legs of the U of said first tightening end, a free end of said second tightening end being about at the radial height of the crossbar of the U of said first tightening end;

wherein said first tightening end is bent back toward said second tightening end substantially at a tangent or in a circumferentially curved manner at a predetermined radial distance from said clamp body;

wherein said tightening ends in the spread-apart state of said clamp body interlock with one another and in the clamping state are unlocked from one another;

wherein a shackle is made by bending a tongue of said first tightening end radially from the outside inwardly;

wherein the shackle at the free end of said first tightening end is bent at the end in the manner of a detent hook radially inwardly onto the clamp body, said shackle in the spread-apart state gripping the free end of the other tightening end lockingly from behind;

wherein said detent hook has a considerably lesser width than the free end of said second tightening end; and

wherein a generally U-shaped engagement opening for said detent hook is provided on the free end of said second tightening end.

4,930,193

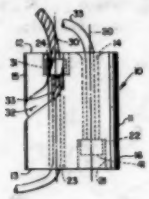
CABLE RETAINING APPARATUS

Carl H. Baker, Mackenzie, Canada, assignor to Baker Cable Ltd., British Columbia, Canada

Filed Mar. 16, 1989, Ser. No. 324,563
Claims priority, application Canada, Nov. 25, 1988, 584248
Int. Cl.[5] F16G 11/00
U.S. Cl. 24—129 R 5 Claims

1. A cable retainer comprising a body, a first passageway extending from one end of said body to the opposite end of said body along a substantially longitudinal axis, a first ferrule receiving shoulder in said first passageway, a second passageway extending through said body along a second longitudinal axis and being substantially parallel to said first passageway, a

second ferrule receiving shoulder in said second passageway and an opening between the outside of said body and said



second longitudinal passageway, said opening being inclined to the axis of said second passageway.

4,930,194

SNAP HOOK FOR USE IN CLIMBING, POT HOLING OR SIMILAR ACTIVITIES

Jean P. Frechin, 215 chemin de la Croix des Pecles, 74400 Chamonix, France

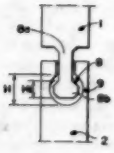
PCT No. PCT/FR86/00394, § 371 Date Jul. 7, 1988, § 102(e) Date Jul. 7, 1988, PCT Pub. No. WO88/03826, PCT Pub. Date Jun. 2, 1988

PCT Filed Nov. 21, 1986, Ser. No. 229,170

Claims priority, application France, May 24, 1985, 8508009; Italy, May 23, 1986, 3584086[U]

Int. Cl.[5] A63B *29/00*

U.S. Cl. 24—573.5 **5 Claims**



1. A snap hook comprising:

a C-shaped body having two ends which are bent towards one another;

an arm mounted for pivoting about a pin positioned at one of said ends of the body, said arm being subjected to a force which urges an end of the arm outward against the other of said ends of the body, said body and said arm each being produced from a sectional piece of light alloy material of identical cross-section which is substantially cylindrical and of constant diameter, said other end of the body and said end of the arm being separable from one another and being shaped as complimentary male and female parts, respectively, thereby enabling said male and female parts to fit inside one another when said end of the arm is driven outward against said other end of the body;

wherein said male part and said female part are inscribed inside the circumference of each sectional piece of said body and said arm, respectively, said male part has a T-shaped cross-section of smaller width than the diameter of said body and substantially the same diameter as said body when viewed in a direction perpendicular and parallel, respectively, to the pivoting pin of said body, and said female part has a complimentary T-shaped cross-section with respect to said male part which is within the circumference of said arm, and dimensions such that a peripheral clearance is left laterally and longitudinally to allow passage of said male part so as to act as a means for peripheral play both laterally and longitudinally, a bottom of said female part corresponds to an extreme end of said male part, said main body portion forming an abutment for the arm which limits its outward movement.

4,930,195

PRESENT INVENTION RELATES TO A SAFETY-BELT BUCKLE

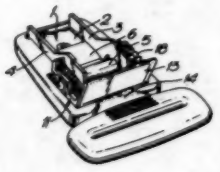
Artur L. Haglund, Vargarda, Sweden, assignor to General Engineering (Netherlands) B.V., Utrecht, Netherlands

Filed Feb. 9, 1989, Ser. No. 308,427

Claims priority, application United Kingdom, Feb. 10, 1988, 8803082

Int. Cl.[5] A44B *11/25*

U.S. Cl. 24—636 **6 Claims**



1. A buckle adapted to receive a tongue mounted on a safety-belt, said buckle comprising means defining a path to receive the tounge, a latching member to engage the tongue, a spring baissed member adapted to eject the tongue from the buckle, a push-button associated with a separate actuating element adapted to move the latching member between a latching position in which the tongue is latched within the buckle and a release position, in which the toungue is ejected from the buckle by the ejector and the ejector becomes located adjacent the latching member, preventing the latching member from returning to the latching position, the push-button being spring-biassed to a predetermined forward-most position, part of the actuating element contacting the push-button when the tongue is inserted in the buckle, the actuating element being connected to the latching member in such a way that when the tongue has been ejected from the buckle the actuating element is retained in a position in which it is separated from the push-button, when the push-button has been spring-biassed to said predetermined forward-most position.

4,930,196

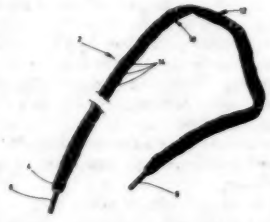
SLIP RESISTANT SHOE LACE

André Lauria, Montreal, Canada, assignor to Locklace Industries Ltd., Montreal, Canada

Filed Mar. 17, 1989, Ser. No. 325,187

Int. Cl.[5] A43C *9/00*

U.S. Cl. 24—715.3 **3 Claims**



1. A slip resistant shoe lace comprising:

an elongated flexible member having an elongated body terminated by first and second ends, a front face, and a back face; and

a strip of rubbery resin material disposed along at least a portion of said elongated body of said elongated flexible member on an outside surface of at least one of said faces and extending between said first and second ends, said strip of rubbery resin material being formed of a plurality of contiguous transverse bars along said portion of said elongated body.

4,930,197

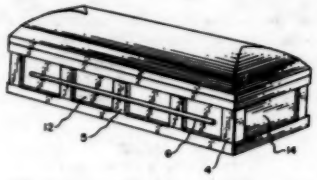
ASSEMBLED CASKET

Ralph T. McClive, 88 Knowlton Ave., Kenmore, N.Y. 14217

Filed Mar. 1, 1989, Ser. No. 317,657

Int. Cl.[5] A61G *17/00*

U.S. Cl. 27—2 **1 Claim**



1. A ready to assemble casket comprising: a body having a side section, a second side section, a first end section, a second end section, and a bottom; said body further having a plurality of interior reinforcing straps: said casket further comprising a plurality of blocks disposed on the outside of the side sections and opposite the reinforcing straps: each of said blocks having a recess disposed therein for receiving a portion of an elongated handle means, and said casket further comprising fastening means for connecting the portions of the handle means to the blocks and reinforcing straps through the side sections, thereby forming an enclosed casket.

4,930,198

APPARATUS FOR TEXTURING CONTINUOUS YARN

Hsin L. Li, Parsippany, and Hendrikus J. Oswald, Morristown, both of N.J., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Division of Ser. No. 594,958, Apr. 2, 1984, Pat. No. 4,765,042, which is a continuation of Ser. No. 357,499, Mar. 12, 1982, abandoned. This application May 31, 1988, Ser. No. 200,483

The portion of the term of this patent subsequent to Aug. 23, 2005, has been disclaimed.

Int. Cl.[5] D02G *1/12, 1/16*

U.S. Cl. 28—257 **8 Claims**

2. An apparatus for crimping a continuous tow of filaments comprising means defining a chamber, said means defining the chamber including a perforated longitudinally and transversely extending filament-receiving means, and an energy tube extending into the chamber having a transverse axis parallel to a transverse axis of the filament-receiving means and a longitudinal axis which is normal to the chamber transverse axis, said energy tube extending from an upstream end where filaments enter the energy tube to a downstream end in close proximity to said filament-receiving means; the improvement wherein the energy tube comprises:

a first stage adjacent the downstream end, the first stage having a cross section with respect to the longitudinal axis with a major axis parallel to the chamber transverse axis and a minor axis normal to the major axis, said first stage having a first dimension along the major axis which is greatest adjacent the downstream end and a second dimension along the minor axis which is smallest adjacent said downstream end, internal surfaces of walls delimiting the first dimension diverging monotonically toward said downstream end less than 10°, while said second dimension decreases monotonically toward said downstream end; and

a second stage connected to the first stage, said second stage having a cross section with respect to the longitudinal axis with a major axis parallel to the chamber transverse axis

and a minor axis normal to the chamber transverse axis, the second stage having a transverse dimension along the major axis and a normal dimension along the minor axis, with the first to second dimension ratio being greater than the transverse to normal dimension ratio.

4,930,199

METHOD FOR MANUFACTURING FIBER FROM THIN PLATE MATERIAL

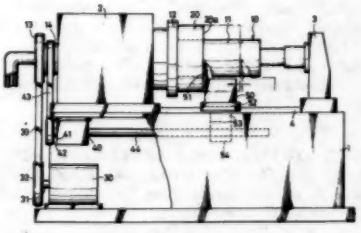
Akira Yanagisawa, 481-1, Nishihara, Miyashiro-machi, Minamisaitama-gun, Saitama-ken, Japan

Filed Dec. 8, 1988, Ser. No. 281,380

Claims priority, application Japan, Dec. 9, 1987, 62-311758; Jun. 13, 1988, 63-144973

Int. Cl.[5] B23B *1/00*; B23P *17/06*

U.S. Cl. 29—4.51 **4 Claims**



1. A fiber manufacturing method comprising the steps of:

winding a strip of thin plate material around the cylindrical outer surface of a rotatably supported main shaft and fixing it thereto;

rotating said main shaft in the direction opposite to that in which said strip of plate material is wound at a fixed speed; and

cutting the end surface of said plate material by a cutter having an edge line expending perpendicular to the axis of said main shaft and a face angle ranging between 21 degrees and 37 degrees by feeding said cutter toward said

end surface of said plate material parallel to the axis of said main shaft and at constant speed.

4,930,200

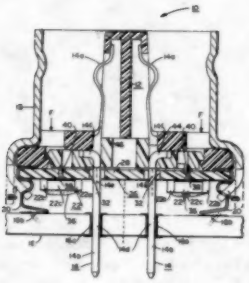
METHOD OF MAKING AN ELECTRICAL FILTER CONNECTOR

Robert W. Brush, Jr., Flemington; Robert M. Scharf, Bedminster; Campbell Davie, Rahway; Arthur A. Lutsky, Springfield, and Frank S. Simo, Monroe Township, Middlesex County, all of N.J., assignors to Thomas & Betts Corporation, Bridgewater, N.J.

Filed Jul. 28, 1989, Ser. No. 386,931

Int. Cl.[5] H01G 7/00

U.S. Cl. 29—25.42 **19 Claims**



1. In a method of making an electrical filter connector of the type including an insulative housing supporting a plurality of electrical contacts, a metal shell supported by said housing substantially surrounding said contacts, a plurality of capacitive elements therein, the improvement comprising the steps of:

providing a substrate with metallized openings therethrough in receipt therein of individual electrical contacts and with a metallized strip on a surface of said substrate spaced from said metallized openings;

providing a plurality of capacitive elements, each being of the type having a first termination and a second termination with a dielectric body therebetween and electrically attaching said first terminations individually to respective portions of said metallized openings and electrically attaching said second terminations to said metallized strip;

applying a curable dielectric material onto the dielectric body of each capacitive element; and

electrically attaching each of said metallized openings of said substrate to said respective electrical contacts.

4,930,201

METHOD FOR MANUFACTURING A COMPOSITE SLEEVE FOR AN ELECTRIC MOTOR

Gerald W. Brown, Christiansburg, Va., assignor to Kollmorgen Corporation, Simsbury, Conn.

Division of Ser. No. 133,730, Dec. 16, 1987, abandoned, which is a division of Ser. No. 765,507, Aug. 14, 1985, Pat. No. 4,729,160.

This application Oct. 14, 1988, Ser. No. 258,085

The portion of the term of this patent subsequent to Mar. 8, 2005, has been disclaimed.

Int. Cl.[5] H02K 15/02

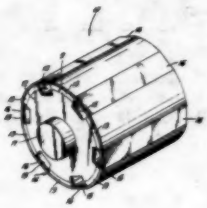
U.S. Cl. 29—598 **3 Claims**

1. A method for manufacturing a composite sleeve for a hollow rotor hub, having a plurality of magnets bonded thereto, for an electric motor or generator which comprises the steps of:

winding the composite sleeve upon a mandrel having a diameter less than that of the rotor hub;

cooling the hollow rotor hub/magnet assembly until it shrinks to a diameter less than that of the sleeve;

inserting the cooled rotor hub/magnet assembly into the composite sleeve; and



pressing the hollow rotor/hub/magnet/sleeve assembly onto the shaft such that both an interference fit between the shaft and the rotor/hub/magnet/sleeve assembly and an interference fit between the composite sleeve and the rotor hub/magnet assembly are achieved.

4,930,202

ROLL WITH A BENT SHAFT

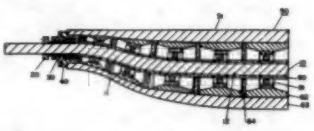
Akechi Yano, 2, Kikusuidori 4-chome, Moriguchishi, Osakafu, Japan

Filed Mar. 17, 1989, Ser. No. 325,168

Claims priority, application Japan, Mar. 25, 1988, 63-73016; Mar. 25, 1988, 63-73017

Int. Cl.[5] B60B 7/04

U.S. Cl. 29—116.2 **9 Claims**



1. A roll for carrying an object comprising:

a roller shaft being bent free of load, said roller shaft having a curved central portion and having outside portions of said central portion bent in different plane directions from a curved plane of the central portion; and

a roller mounted to rotate around said roller shaft, said roller having a circumference which changes toward both outside end portions from the central portion, and said roller deforming with cyclical expansion and contraction in a direction of width while being rotated about said roller shaft such that at least one axial flat line is defined along an external periphery of said roller.

4,930,203

CLINCHING TOOL

Robert E. Obrecht, Bloomfield Hills, and Edward J. Waltonen, Southfield, both of Mich., assignors to Lamb Robo Inc., Bloomfield Hills, Mich.

Continuation of Ser. No. 901,621, Aug. 29, 1986, Pat. No. 4,803,767. This application Feb. 15, 1989, Ser. No. 310,211

The portion of the term of this patent subsequent to Feb. 14, 2006, has been disclaimed.

Int. Cl.[5] B23P 11/00

U.S. Cl. 29—243.5 **5 Claims**

1. A clinching tool for fastening two sheet of material together, said tool comprising:

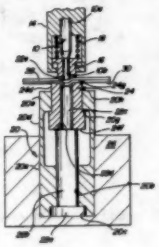
(A) a punch adapted to be mounted in a punch retainer; and

(B) a die including

(1) a split bushing,

(2) a collet including a base portion and a plurality of spring fingers extending in cantilever fashion from said base portion in circumferentially spaced relation to the axis of said punch to define a central axial passage aligned with said punch axis and including free end portions yieldably engaging circumferentially spaced locations on said bushing,

(3) a pin member including a shank portion and a working end for coaction with said punch,



(4) means mounting said pin member in said collet with said shank portion extending into said bushing and with said working end inset with respect to the end of said bushing adjacent said punch by a distance related to the thickness of the materials to be joined together, and

(5) means precluding axial movement of said pin member within said collet in a direction toward said collet base portion.

4,930,204

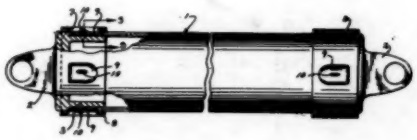
METHOD OF FORMING COMPOSITE TUBULAR STRUCTURE

Robert M. Schurter, Elm Grove, Wis., assignor to A. O. Smith Corporation, Skokie, Ill.

Continuation of Ser. No. 305,182, Feb. 1, 1989, abandoned, which is a division of Ser. No. 28,662, Mar. 20, 1987, abandoned. This application Sep. 18, 1989, Ser. No. 409,265

Int. Cl.[5] B23P *17/00*

U.S. Cl. 29—419.2 8 Claims



7. A method of forming a composite shaft construction, comprising the steps of forming a tubular member of fibrous material bonded with a cured thermosetting resin, forming a plurality of longitudinally elongated slots through an end of said tubular member, positioning said end in overlapping contacting relation to a cylindrical sleeve portion of a metal yoke to provide an overlapping joint, said sleeve portion being exposed through said slots, positioning a continuous uninterrupted metal ring around said joint, and deforming spaced portions of said ring through said slots to provide inwardly deformed longitudinally elongated circumferentially spaced sections offset radially inward and disposed in contact with said sleeve portion.

4,930,205

METHOD OF SECURING PLASTIC ROLL TO METAL CORE ROLLER

Yvon Tasse, St.-Pascal Baylon, Ontario, Canada K0A 3N0

Filed Jan. 23, 1989, Ser. No. 299,605

Claims priority, application Canada, Jan. 28, 1988, 557598

Int. Cl.[5] B23P *11/02*

U.S. Cl. 29—450 7 Claims

1. A method of making hard rollers for commercial printing presses, comprising the sequential steps of:

(a) heating a cylindrical sleeve of plastic material to a temperature high enough to produce a sufficient elastic state in the material to enable it to be stretched over a cylindrical metal core having an outer diameter of between 5% to 20% greater than the inner diameter of the cylindrical sleeve at normal temperatures of the sleeve and core;

(b) stretching the sleeve while thus heated into position over the cylindrical metal core; and

(c) cooling the cylindrical sleeve,

whereby the cooled sleeve will shrink to further secure it in position on the core.

4,930,206

APPARATUS AND METHOD FOR FIXING AND POSITIONING A NUT PLATE

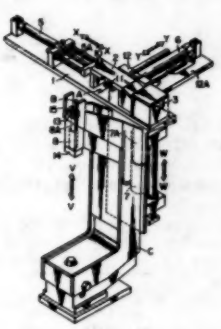
Takashi Suzuki, and Yukio Kimura, both of Tokyo, Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 24, 1989, Ser. No. 356,113

Claims priority, application Japan, May 26, 1988, 63-128781

Int. Cl.[5] B21D *39/00*; B23R *11/00*

U.S. Cl. 29—525.2 9 Claims



1. An apparatus for positioning a nut plate provided with a nut having a nut hole and with a hole through which a rivet is driven to fix the nut plate to a plate, comprising:

a reference plate;

a support plate disposed below said reference plate with a space therebetween;

moving means for moving said support plate with respect to said reference plate;

feeding means for supplying the nut plate into the space;

a nut plate bracing member disposed directly below said nut plate supplied in the space and provided with a pin to be fitted into the hole of said nut plate;

transfer means for transferring said nut plate bracing member so that said nut plate is transferred to a position directly below the plate to which the nut plate is to be fixed;

elevating means for elevating said nut plate bracing member to position the nut plate to a fixing position of said plate; and

a nut plate holding member disposed to be elevatable so as to support said nut plate adjacent to said plate.

4,930,207

METHOD AND APPARATUS FOR CONTINUOUS COMPRESSION FORGING OF CONTINUOUSLY CAST STEEL

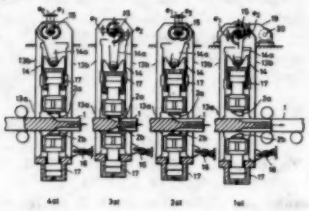
Shinji Kajima, Okayama; Toshitane Matsukawa, Kurashiki; Hisakazu Minota, Okayama; Susumu Yubara, Kurashiki; Yoshio Yoshimoto; Toshio Fujimura, both of Okayama, and Kunihiro Ito, Kobe, all of Japan, assignors to Kawasaki Steel Corp.

Continuation-in-part of Ser. No. 71,412, Jul. 9, 1987, abandoned. This application May 24, 1989, Ser. No. 356,125

Claims priority, application Japan, Jun. 7, 1988, 63-138472; Jun. 30, 1988, 63-163822

Int. Cl.[5] B21B 1/46

U.S. Cl. 29—527.5 10 Claims



1. In a method of continuous compression forging, with a compression forging anvil, cast steel drawn from a continuous casting mold, the step which comprises:

compressing said cast steel with said anvil using a compressing cycle which meets the following conditions:

$$t \leq \frac{1}{2Vc \tan\theta}(\delta - 0.06\sqrt{D - 80})$$

where

t: the compressing cycle (sec)

δ: the overall thickness reduction (mm)

V_c: the casting speed (mm/sec)

D: the cast steel thickness (mm) before compressing forging, and

θ: the inclination angle (°) with respect to the flat surface of the anvil.

4,930,208

MACHINE TOOL

Hans-Henning Winkler, Tuttlingen, and Eugen Rütschle, Mühleim, both of Fed. Rep. of Germany, assignors to Chiron-Werke GmbH & Co. KG, Tuttlingen, Fed. Rep. of Germany

Filed Aug. 24, 1989, Ser. No. 398,084

Claims priority, application Fed. Rep. of Germany, Aug. 27, 1988, 3829105

Int. Cl.[5] B23Q 3/157

U.S. Cl. 29—568 5 Claims

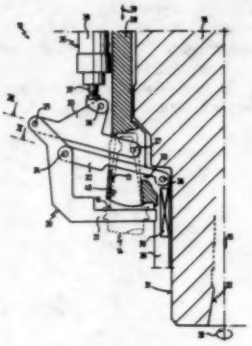
1. A machine tool, comprising:

a toolholder magazine for storing a plurality of toolholders, said toolholders having a tapered clamping section and a tool section;

a spindle having rotatable receiving means for receiving said toolholder clamping sections;

a plurality of transfer means, each of said transfer means being assigned to one predetermined toolholder for transferring said one toolholder from a magazine position within said toolholder magazine into a spindle position adjacent said receiving means and for inserting said clamping section into said receiving means; and

splashguard means arranged at said toolholder magazine and having a plurality of tapered cavities for receiving and covering said tapered clamping sections of each of said



toolholders when said toolholders are in said magazine position.

4,930,209

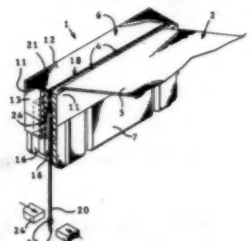
METHOD FOR ASSEMBLY OF LANYARD AND CONNECTOR

John T. Haddock, Lititz; Charles A. Miller, York New Salem; Stanford C. Moist, Jr., Hummelstown; Warren D. Nauman, Elizabethtown, and Ronald S. Pala, Mechanicsburg, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Division of Ser. No. 326,762, Mar. 21, 1989, Pat. No. 4,881,911. This application Jul. 14, 1989, Ser. No. 380,225

Int. Cl.[5] H01R 43/00

U.S. Cl. 29—592.1 6 Claims



1. A method of installing a lanyard on a connector, comprising the steps of;

extending a corresponding passage from an exterior surface of a connector to a corresponding recess of the connector, inserting a first end of a lanyard along the corresponding passage, tying a knot in the first end of the lanyard, sizing the knot, extending the lanyard in an open loop across the surface, and anchoring a second end of the lanyard to the connector.

4,930,210

METHOD FOR ASSEMBLING AN ELECTRIC MOTOR ARMATURE

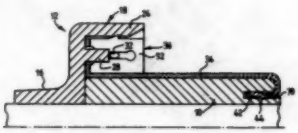
Patrick S. Wang, Repulse Bay, Hong Kong, assignor to Johnson Electric Industrial Manufactory Limited, Chaiwan, Hong Kong

Division of Ser. No. 78,994, Jul. 29, 1987. This application Nov. 29, 1988, Ser. No. 277,348

Claims priority, application United Kingdom, Mar. 16, 1987, 8706167; Apr. 13, 1987, 8708781

Int. Cl.[5] H01R *43/06*; H02K *15/09*

U.S. Cl. 29—597 **4 Claims**



1. A method of assembling an armature of an electric motor comprising the steps of:

providing an armature core;

providing a commutator unit having commutator segments thereon, said commutator segments each including a respective commutator segment terminal;

providing a terminal support separate from said commutator unit and having housings for said terminals;

disposing said armature core and said terminal support coaxially;

winding an armature winding on said core and winding connector portions of said winding through said housings;

disposing said commutator unit coaxially with said armature core and terminal support; and

bodily moving the commutator unit relative to the terminal support thereby inserting simultaneously each said terminal into a respective housing and effecting direct electrical contact and mechanical engagement between each said commutator segment terminal and a respective one of said connector portions.

4,930,211

SILVER ELECTRODE FOR ELECTROCHEMICAL CELL

Larry J. Gaudino, Greensboro, N.C., assignor to Technitrol, Inc., Wyndmoore, Pa.

Filed Jun. 20, 1988, Ser. No. 208,433

The portion of the term of this patent subsequent to Jul. 4, 2006, has been disclaimed.

Int. Cl.[5] H01M *6/00*

U.S. Cl. 29—623.5 **3 Claims**

1. The method of making a porous silver electrode for an electrochemical cell comprising the steps of providing a metal substrate having a thin coating of silver thereon, depositing on the silver side of the substrate a thin layer of a thick film paste, the paste comprised of powdered glass frit and fine silver powder, the glass frit having a melting temperature below about 600° C., pressing onto the paste layer a layer of battery grade silver powder, and firing the combination at about 600° C. to bond the battery grade silver powder to the metal substrate.

4,930,212

MACHINE FOR ASSEMBLING THE DIFFERENT PARTS OF A FITTING ELEMENT OF A DOOR OR WINDOW FITTING

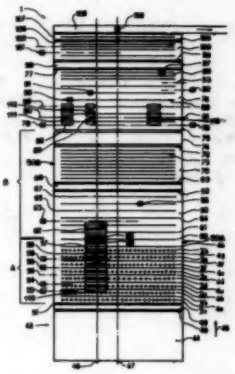
Jean-Jacques Kautt, Strasbourg, France, assignor to Ferco International, Sarrebourg, France

Filed Sep. 13, 1988, Ser. No. 243,713

Claims priority, application France, Sep. 21, 1987, 87 13171

Int. Cl.[5] B23P *21/00*

U.S. Cl. 29—788 **7 Claims**



1. A machine for assembling various parts to a fitting element, comprising:

(A) a plurality of supply magazines that contain parts that are to be attached to said fitting element;

(B) a plurality of gripping means that operate to remove said parts that are stored in said storage magazines;

(C) means for delivering said fitting element to an entry point of said assembly machine;

(D) a plurality of transporters for advancing said fitting element step by step along an assembly path of said assembling machine to predetermined assembly points proximate each storage magazine;

(E) means of selectively placing said transporters into a a waiting state so that a part can be assembled to said fitting element, one of said gripping means operating to remove said part to be attached to said fitting element from one of said storage magazines associated with one of said transporters;

(F) a plurality of manipulators for attaching said parts to said fitting element;

(G) a plurality of transferring means, each transferring means being interposed between two transporters for transferring said fitting element from one transporter to another transporter, said transferring means orienting said fitting element to a desired position so that said parts in said storage magazine can be attached to the proper place on said fitting element wherein the machine includes a means for flipping over the fitting element so that parts can be attached to the appropriate side of the fitting element;

(H) means for removing said assembled fitting element from said assembling machine; and

(I) wherein said fitting element comprises a plate and an operating rod that are connected together in a working relationship; and

(J) wherein said assembling machine includes two superimposed transporters that move step by step, one of said superimposed transporters moving said operating rod while the other superimposed transporter moves said plate, the inner face of said plate being oriented to face upward, said operating rod being positioned below said

plate at a predetermined point along the travel path of said assembly machine, a part being assembled onto said operating rod and said plate being connected to said operating rod; and

(K) wherein an oscillating loading arm takes said plate from said lower of said two superimposed transporters and places it, after turning it around, on the first of said plurality of transporters, a transfer element ensuring that said operating rod is placed below said plate at the entry of this first transporter.

4,930,213

SYSTEM FOR TRANSFERRING VEHICLE BODY FROM A COATING STATION TO AN ASSEMBLY LINE AND AN OVERHEAD CONVEYOR

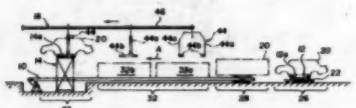
Hiroshi Hayakawa; Hiroaki Maenishi, and Kazuo Okamoto, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Apr. 21, 1988, Ser. No. 184,575

Claims priority, application Japan, Apr. 24, 1987, 62-101444; Apr. 24, 1987, 62-101445

Int. Cl.[5] B23P *19/00*

U.S. Cl. 29—793 **12 Claims**



1. A system for transferring a vehicle body from a coating station to an assembly line comprising:

a first vehicle body conveying means for supporting a lower portion of the vehicle body and conveying the vehicle body along a conveying path;

a second overhead vehicle body conveying means including a hanger having at least one vertical arm means positioned substantially at the center of a side of the vehicle body and a support portion for supporting said lower portion of the vehicle body;

a door removing station positioned along said first vehicle body conveying means for removing at least one door from said vehicle body before the vehicle body is positioned on said second overhead vehicle body conveying means; and

a vehicle body transferring means disposed downstream of said door removing station for transferring the vehicle body from said first vehicle conveying means to said second overhead vehicle conveying means;

wherein said door is removed from the vehicle body without the interference of either said first vehicle body conveying means or said second overhead vehicle conveying means.

4,930,214

METHOD FOR CONTAINING RF EMISSIONS FROM A SIGNAL PROCESSING CIRCUIT

David A. Werdin, and Reinhold Henke, both of St. Paul, Minn., assignors to ADC Telecommunications, Inc., Minn.

Division of Ser. No. 54,080, May 21, 1987, Pat. No. 4,751,613, which is a continuation of Ser. No. 868,391, May 23, 1986, abandoned. This application Sep. 18, 1987, Ser. No. 99,383

The portion of the term of this patent subsequent to Jun. 14, 2005, has been disclaimed.

Int. Cl.[5] H05K *3/36, 3/02, 3/10*

U.S. Cl. 29—830 **2 Claims**

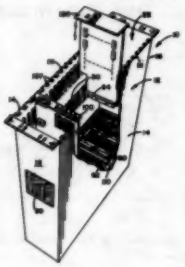
1. A method of constructing a low RF emission circuit board comprising the steps of:

(a) providing a plurality of circuit boards which may be plated;

(b) plating at least one side of two different boards to provide a pair of chassis ground plane layers to be connected to a chassis ground;

(c) plating one side of one of said boards with signal interconnection traces to form an interconnect layer for connecting a plurality of integrated circuits;

(d) sandwiching said plated boards together to form a multilayered printed circuit board with said interconnect layer sandwiched between said chassis ground plane layers;



(e) mounting electrical components to said multilayered board so that the components are electrically interconnected by said interconnection paths to form a circuit and so that the RF emissions from the interconnection paths when the circuit is operating are substantially contained within the enclosure of said chassis ground plane layers.

4,930,215

METHOD FOR THE FABRICATION OF A CONNECTION ZONE FOR A SYMMETRICAL STRIP LINE TYPE MICROWAVE CIRCUIT AND CIRCUIT OBTAINED THEREBY

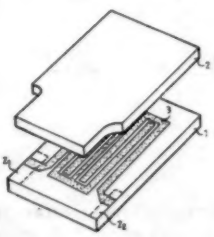
Pascal Roche, Sartrouville, and Yin H. Muoy, Montmorency, both of France, assignors to Thomson-CSF, Paris, France

Filed Aug. 24, 1989, Ser. No. 401,087

Claims priority, application France, Aug. 30, 1988, 88 11356

Int. Cl.[5] H05K *3/36*

U.S. Cl. 29—830 **4 Claims**



1. A method for the fabrication of a connection zone for a symmetrical strip line type circuit, comprising:

a first step for the deposition of a first conductive layer on a first face of a first substrate, forming a first ground plane of the symmetrical strip line circuit;

a second step for the deposition of a second conductive layer on a first face of a second substrate, forming a second ground plane of the symmetrical strip line circuit;

a third step for the deposition of a conductive pattern on the second face of the first substrate, forming the central conductor of the symmetrical strip line circuit;

a fourth step for the making of a groove on the second face of the second substrate, along the contour of said connection zone;

a fifth step for the bonding of the second face of the first substrate to the second face of the second substrate;

a sixth step for the deposition of a layer for the protection of the external surfaces of the circuit;

a seventh step for the making of a counter-groove on the first face of the second substrate along said contour, so as to completely eliminate the material forming the second substrate along this contour, and elimination of that part of the second substrate located inside the contour.

4,930,216

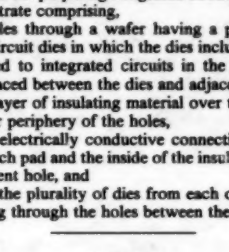
PROCESS FOR PREPARING INTEGRATED CIRCUIT DIES FOR MOUNTING

Bradley H. Nelson, Austin, Tex., assignor to Microelectronics and Computer Technology Corporation, Austin, Tex.

Filed Mar. 10, 1989, Ser. No. 321,500

Int. Cl.[5] H05K *13/04*

U.S. Cl. 29—854 **8 Claims**



1. A process for preparing integrated circuit dies for mounting on a substrate comprising,

making holes through a wafer having a plurality of integrated circuit dies in which the dies include pads thereon connected to integrated circuits in the dies, said holes being placed between the dies and adjacent the pads,

placing a layer of insulating material over the wafer and in the outer periphery of the holes,

adding an electrically conductive connection between the top of each pad and the inside of the insulsting material in an adjacent hole, and

separating the plurality of dies from each other along lines extending through the holes between the dies.

4,930,217

ELECTRIC SHAVING APPARATUS WITH A SHAVING HEAD CONTROL MEANS

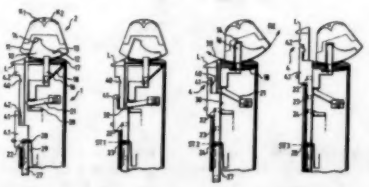
Jürgen Wolf, Kriftel; Albrecht Jestädt, Friedrichsdorf; Hans E. Heintke, Wächtersbach, and Michael Odemer, Frankfurt, all of Fed. Rep. of Germany, assignors to Braun Aktiengesellschaft, Kronberg, Fed. Rep. of Germany

Filed Jul. 22, 1988, Ser. No. 223,554

Claims priority, application Fed. Rep. of Germany, Aug. 7, 1987, 3726354

Int. Cl.[5] B26B *19/10*

U.S. Cl. 30—43.92 **29 Claims**



1. An electric shaving apparatus comprising a housing, a shaving head having two side walls, structure supporting said shaving head on said housing for free pivotal movement about a pivot axis (Z), said shaving head having at least one upper cutter and at least one lower cutter driven by a motor and in cooperative relation with said upper cutter,

at least one actuating switch on said housing, follower structure molded in at least one of said two side walls of said shaving head,

and control structure movable in response to said actuating switch between a first position spaced from said follower structure in which said shaving head is freely pivotable about said pivot axis and a second position in engagement with said follower structure for positively rotating said shaving head about said pivot axis to a predetermined detent location, and anchoring said shaving head in said predetermined detent location,

said follower structure including two abutment stops for limiting the pivot movement of said shaving head about said pivot axis (Z), at least one control cam provided between said two abutment stops, and at least one detent location, and

said control structure including at least one displaceable tappet portion for engaging said follower structure, said shaving head being automatically movable by said tappet portion from any pivot position via said control cam into a predetermined detent location and locked in said detent location by operation of said actuating switch acting on said tappet portion directly or indirectly.

4,930,218

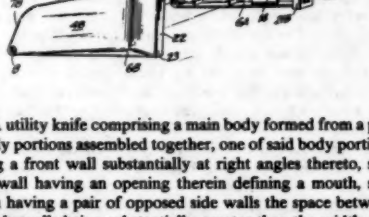
UTILITY KNIFE

Daniel Jacoff, Mineola, N.Y., assignor to Great Neck Saw Manufacturers, Inc., Mineola, N.Y.

Filed Apr. 13, 1989, Ser. No. 337,479

Int. Cl.[5] B26B *3/03, 3/06*

U.S. Cl. 30—162 **4 Claims**



1. A utility knife comprising a main body formed from a pair of body portions assembled together, one of said body portions having a front wall substantially at right angles thereto, said front wall having an opening therein defining a mouth, said mouth having a pair of opposed side walls the space between said side walls being substantially greater than the width of a blade, and restricting means extending from one of said opposed side walls of said mouth to narrow the space within the mouth so that a blade only may pass between the restricting means and the other of said opposed side walls.

4,930,219

NOTCHING SCISSORS TO NOTCH AND TRIM CURVED SEAMS

Patricia B. Nadeau, 573 Loring Village Ct., Orange Park, Fla. 32073

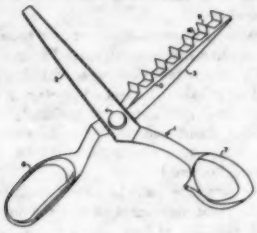
Filed Mar. 17, 1989, Ser. No. 324,760

Int. Cl.[5] B26B *13/00*

U.S. Cl. 30—230 **4 Claims**

1. Hand operated notch cutting scissors for use in cutting textile fabric, comprising pivotally connected first and second blades, said first blade having a different configuration from said second blade, said first blade having a series of triangular cutting teeth spaced by a linear cutting edge at the base of each of said teeth, said second blade having a series of trapezoidal

cutting teeth forming a cutting edge complementary to the cutting teeth and linear cutting edge of said first blade, whereby the cutting edge of said second blade is brought into



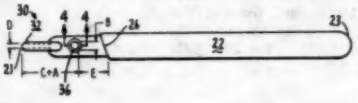
continuous progressive contact with the cutting teeth and linear cutting edge of said first blade to perform a simultaneous notching and trimming action.

4,930,220

SCALPEL BLADE HOLDER

George D. H. Loo, 9814 Curwood Pl., Beverly Hills, Calif. 90210

Filed Mar. 29, 1989, Ser. No. 330,226
Int. Cl.[5] B26B *1/00*
U.S. Cl. 30—339 **6 Claims**



1. A scalpel blade holder for holding a scalpel blade having a blade portion near the anterior thereof and a blunt portion near the posterior thereof, a substantially elongated first hole near the blunt portion of said scalpel blade, said first hole having a first length and a first width with said first length being parallel to the direction from the anterior to the posterior; a substantially elongated second hole anterior to and coextensive with said first hole, said second hole having a second length parallel to and collinear with said first length, and a second width smaller than said first width, said holder comprising:

an elongated handle member having a length, a width, and a thickness; said member having a distal end and a proximal end along said length;

an elongated support member connected to said handle member and being an integral part thereof, near said distal end of said handle member; said support member having a groove along its periphery, parallel to said length direction, wherein the width of said support member between said groove is substantially equal to said second width of said blade, and wherein the length of said support member is less than the sum of said first and second lengths of said blade;

a slidable member in said handle member, movable along said thickness direction, said slidable member having a width substantially equal to the first width of said blade and positioned in said handle member such that the distance from the proximal end of said slidable member to the groove at the distal end of said support member is substantially the same as the sum of said first and second lengths of said blade; and

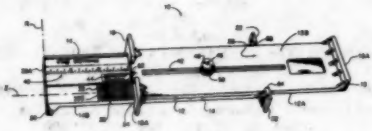
means for locking said slidable member in said thickness direction between a first position and a second position, wherein said first position said slidable member is above the plane of the groove, and in said second position said slidable member is just below the plane of the groove.

4,930,221

UNIVERSAL PRECISION MEASURING GAUGE

Christopher L. Taylor, 3615 Courtdale Dr., Farmers Branch, Tex. 75234

Continuation-in-part of Ser. No. 117,954, Nov. 9, 1987, Pat. No. 4,793,604. This application Dec. 21, 1988, Ser. No. 288,417
Int. Cl.[5] G01B *5/14*; B43L *13/02*
U.S. Cl. 33—811 **4 Claims**



1. A measuring gauge for positioning the working surface of a tool relative to a reference surface disposed on apparatus for supporting a workpiece, said measuring gauge comprising, in combination:

first and second body members having first and second major surfaces disposed in facing relationship, each body member having a longitudinal axis;

first and second rack means disposed on said first and second major surfaces, respectively, each of said first and second rack means having a plurality of teeth spaced at predetermined intervals along a longitudinal axis of the corresponding rack means, said teeth of said first and second rack means being releasably disposed in mesh engagement;

fastener means for releasably measuring said body members together; and,

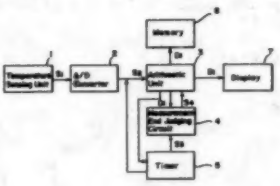
each of said body members including first and second end plates disposed on respective opposite ends of each body member, each end plate having an end surface which projects transversely with respect to the longitudinal axis of the corresponding body member, one of said end plates on each body member having a window opening through which the other body member can be extended and retracted.

4,930,222

ELECTRONIC CLINICAL THERMOMETER

Yasuhiro Nakanishi, Nara; Yutaka Ikemoto, and Takashi Suzuki, all of Nara, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Division of Ser. No. 939,794, Dec. 9, 1986, Pat. No. 4,833,689. This application Mar. 16, 1989, Ser. No. 324,457
Claims priority, application Japan, Dec. 9, 1985, 60-277638
Int. Cl.[5] G01K *7/00*
U.S. Cl. 374—170 **2 Claims**



1. An electronic clinical thermometer comprising:

a temperature sensing unit for sensing a body temperature and generating a signal corresponding to the sensed body temperature;

arithmetic means for calculating a current body temperature in response to the signal generated by said temperature sensing unit;

memory means for sequentially updating and storing a most

recently measured body temperature in response to said arithmetic means calculating the current body temperature;

display means for displaying either of said current body temperature calculated by said arithmetic means or said most recently measured body temperature stored in said memory means;

means for enabling the display of said most recently measured and memorized body temperature for a predetermined period of time by initially turning a power switch to an "ON" position after said power switch has been set in an "OFF" position after completing the measurement of said most recently measured and memorized body temperature;

the display of said most recently memorized body temperature being replaced after said predetermined length of time by a display of an ambient temperature; and

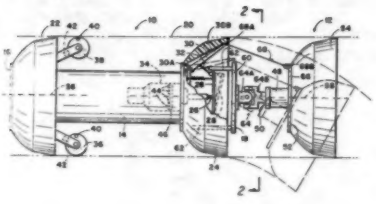
means for initiating and displaying said calculated current body temperature subsequent to display of said ambient temperature, whereby the most recently memorized body temperature is updated.

4,930,223

BEND DETECTOR PIG

Dennis R. Smith, Tulsa, Okla., assignor to TDW Delaware, Inc., Tulsa, Okla.

Filed Feb. 27, 1989, Ser. No. 315,795
Int. Cl.[5] G01B *5/20, 7/28*
U.S. Cl. 33—302 **15 Claims**



8. A pipeline pig for providing indications of the deviations of an inner wall of a pipeline from a nominal cross-sectional configuration, and changes in direction of the pipeline, comprising:

a first pig body assembly having a longitudinal axis and means for supporting the first pig body assembly in a pipeline wherein the longitudinal axis is at least approximately the pipeline center and means for impeding the flow of fluid therepast so that the pig body is propelled by such fluid flow along the pipeline;

an integrator plate carried by said first pig body assembly;

means for deflecting said integrator plate in response to deviations in the internal pipeline wall;

means for detection of the deflection of said integrator plate and for recording the detected deflections;

a second pig body assembly having a longitudinal axis and means to support the second pig body assembly in a pipeline wherein the longitudinal axis is at least approximately the pipeline centers and means connecting the second to the first pig body assembly; and

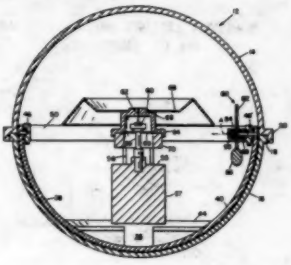
means for deflecting said integrator plate in response to the deflection of said second pig body assembly longitudinal axis relative to said first pig body assembly longitudinal axis.

4,930,224

MAGNETIC COMPASS

Kenneth LeBlanc, Gloucester, Mass., assignor to Rule Industries, Inc., Gloucester, Mass.

Continuation-in-part of Ser. No. 59,567, Jun. 8, 1987, abandoned. This application Aug. 12, 1988, Ser. No. 231,890
Int. Cl.[5] C01C *17/14*
U.S. Cl. 33—355 D **9 Claims**



1. In a magnetic compass unit comprising a compass bowl, a card assembly pivotally supported on a pivot shaft within said bowl, said card assembly comprising a compass card and a magnet, a bearing member defining a pivot bearing, said card assembly mounted to pivot upon said pivot bearing, and at least one active indicator pin adapted for alignment with the lubber line of a supporting vehicle and with an adjacent degree indicia line upon said compass card,

the improvement wherein

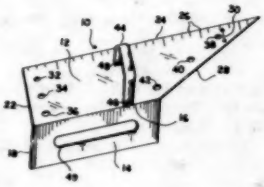
said active indicator pin is mounted to pivot apart from said card assembly, to pivot apart from said bearing member, and to pivot apart from said pivot shaft, whereby said indicator pin remains disposed generally in a common plane with said adjacent degree indicia line during conditions of compass roll.

4,930,225

DECK BOARD SPACER AND NAILING GUIDE

Charlotte N. Phillips, 10401 SW. 35th St., Portland, Oreg. 97219

Filed Feb. 16, 1989, Ser. No. 310,899
Int. Cl.[5] G01B *3/30, 3/32*
U.S. Cl. 33—526 **10 Claims**



1. A tool for use in marking, cutting, spacing, and/or securing boards or planks in deck, roof, or fence construction, and the like, comprising;

a continuous trapezoidal planar surface for placement on the top surface of a plank.

said trapezoidal planar surface including a flange 14 of a proper thickness to provide proper spacing between adjacent boards or planks, perpendicularly attached to one edge of said

an edge on said trapezoidal planar surface parallel to said flanged one edge, and

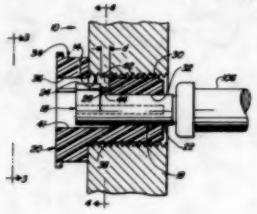
a plurality of apertures disposed through said trapezoidal planar surface and arranged in a straight line of a size and position to allow the proper spacing of nails or other fasteners.

4,930,226

SENSOR ADJUSTMENT GAUGE

Aloysius C. Shindelar, Hudson, Iowa, assignor to Deere & Company, Moline, Ill.

Filed May 22, 1989, Ser. No. 355,240
Int. Cl.[5] G01B 5/18
U.S. Cl. 33—655 **6 Claims**



1. A gauge for determining a spacing distance required to position a sensor in a sensor bore in a housing so that the sensor is properly positioned relative to an actuator member positioned adjacent to one side of the housing, the gauge comprising:

a pin member comprising a pin and a flange extending from one end thereof, the flange defining a first abutment surface thereon; and

a ferrule comprising a shaft for removable insertion into the sensor bore, the shaft having a pin bore extending therethrough for slidably receiving the pin, a portion of one end of the shaft defining a second abutment surface, the ferrule also comprising a head having an opening extending therethrough, and the ferrule comprising a connecting member joining the shaft and the head, the connecting member defining a channel which extends from the pin bore to the head opening, the pin and flange being movable through the opening and the channel so that the pin is slidably received by the pin bore, the pin being slidable through the pin bore to a gauging position wherein the pin projects outwardly from the shaft and engages the actuating member so that the engagement of the actuating member with the pin moves the pin relative to the ferrule whereby the first and second abutment surfaces separate by a distance equal to the spacing distance.

4,930,227

COILABLE TAPE RULE WITH IMPROVED END HOOK

Paul A. Ketchpel, Simsbury, Conn., assignor to The Stanley Works, New Britain, Conn.

Filed Feb. 21, 1989, Ser. No. 313,723
Int. Cl.[5] G01B 3/10
U.S. Cl. 33—755 **8 Claims**

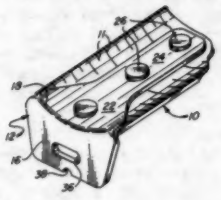
1. In a coilable tape rule, the combination comprising:

(a) a housing providing a chamber therewithin and having a peripheral wall with an aperture therethrough;

(b) a spring motor in said housing;

(c) an elongated metallic tape coiled in said housing about said spring motor and having its inner end coupled to said spring motor and its outer end extending outwardly through said aperture;

(d) an elongated hook on said outer end of said tape, said hook having an elongated body portion extending axially of said tape a distance greater than the transverse dimension of said tape, said hook also having a depending leg portion at the outer end of said body portion with its upper end configured and dimensioned to substantially conform to the outer edge of said tape in its extended state, said leg portion extending closely adjacent said outer edge of said tape, said body portion tapering inwardly from said leg portion to a reduced width, said tape in its uncoiled state and said body portion of said hook being of cooperating arcuate cross section; and



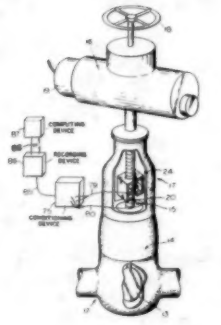
(e) at least three fastening members spaced axially along and secured in apertures in said outer end of said tape and in said body portion of said hook, said fastening members having head portions at either end bearing directly against the outer surfaces of said blade and said hook respectively, said apertures in said hook being axially elongated slots, and said heads bearing against said hook being of greater width tab said slots.

4,930,228

STEM LOAD DETERMINING SYSTEM

Paul G. Anderson, and John A. McMennamy, both of Cobb County, Ga., assignors to Movats Incorporated, Marietta, Ga.

Continuation of Ser. No. 41,006, Apr. 21, 1987, which is a continuation of Ser. No. 36,024, Apr. 8, 1987. This application Oct. 17, 1988, Ser. No. 258,659
Int. Cl.[5] G01B 5/00
U.S. Cl. 33—788 **6 Claims**



1. An apparatus for monitoring the axial deformation in a stem or other symmetrical object which is subjected to a load, said apparatus comprising:

first gripping member positioned along the object;

second gripping member cooperating with said first gripping member to releasably and tightly grip the object between them;

third gripping member positioned along the object at a position axially displaces from said first gripping member;

fourth gripping member cooperating with said third gripping member to releasably and tightly grip the object between them;

wherein said first and third gripping members are capable of relative movement to one another in each of the axial,

radial and angular directions in response to forces acting on the object, and wherein said second and fourth gripping members are capable of independent relative movement relative to one another in each of the axial, radial and angular directions in response to forces acting on the object;

first movement detecting means for detecting the axial component of the relative movement between said first and third gripping members and for generating an electrical signal representative of said axial component;

second movement detecting means for detecting the axial component of the relative movement between said second and fourth gripping members and for generating an electrical signal representative of said axial component of movement between said second and fourth gripping members; and

means for combining said signal from said first movement detecting means and said signal from said second movement detecting means in a predetermined manner, thus providing a signal representative of the axial deformation of the object;

said first movement detecting means and said second movement detecting means each being so comprised as to not inhibit said independent relative movement of said gripping members in each of the radial and angular directions, whereby freedom of movement is available between the first and third gripping members and between the second and fourth gripping members for at least some distance in each of the axial, radial and angular directions and whereby axial deformation of the object is measurable while the object is experiencing any and all of axial, bending and torsional forces.

4,930,229

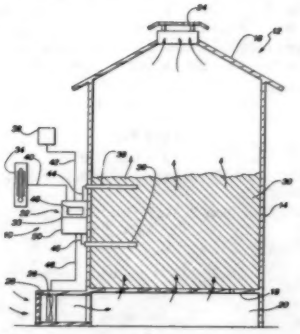
METHOD AND APPARATUS FOR AERATION OF STORED GRAIN WITH PROACTIVE COOLING

Wayne A. Moser, Minneapolis, Minn., assignor to Sentry Technologies, Inc., Chanhassen, Minn.

Filed Feb. 23, 1989, Ser. No. 315,299

Int. Cl.[5] F26B *3/06*

U.S. Cl. 34—34 **26 Claims**



1. A method for controlling aeration of stored grain of a specified type that is to be maintained at or near a specified desired grain moisture content, comprising the steps of:

(a) measuring the current ambient air temperature;

(b) measuring the current ambient air relative humidity level;

(c) determining for the specified grain type the equilibrium moisture content corresponding to said current ambient temperature and relative humidity measurements;

(d) determining a short term running average ambient temperature from a plurality of time-spaced measurements of ambient air temperature taken over a specified first period of time;

(e) determining a long term running average ambient temperature from a plurality of time-spaced measurements of ambient air temperature taken over a specified second period of time, substantially longer than said first period of time;

(f) determining the difference between said short term and long term running average ambient temperatures;

(g) defining an acceptable range of ambient temperatures around said short term running average ambient temperature during which grain aeration can occur, using said short term running average ambient temperature as the range centerpoint;

(h) defining an acceptable range of grain moisture content around said desired grain moisture content during which grain aeration can occur;

(i) adjusting the centerpoint of the acceptable range of ambient temperatures downward by a specified offset when it is determined that the short term running average ambient temperature is a predetermined amount lower than the long term running average ambient temperature; and

(j) aerating said grain when the current ambient air temperature is within said defined acceptable temperature range, including any offset adjustment thereto, and said equilibrium moisture content is within said defined acceptable grain moisture content range.

4,930,230

APPARATUS FOR THE CONDITIONING OF BULK MATERIAL

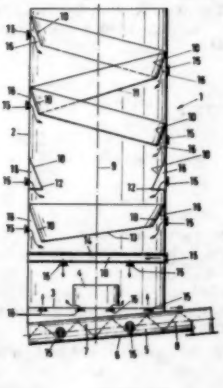
Werner Weckherlen, Weinstadt; Hans-Joachim Dellit, Remshalden, and Hans-Georg Gruene, Esslingen, all of Fed. Rep. of Germany, assignors to Schwaebische Huettien-Werke GmbH, Aalen-Wasseral-fingen, Fed. Rep. of Germany

Filed Jan. 30, 1989, Ser. No. 303,335

Claims priority, application Fed. Rep. of Germany, Jan. 28, 1988, 3802489

Int. Cl.[5] F26B *11/02*

U.S. Cl. 34—168 **20 Claims**



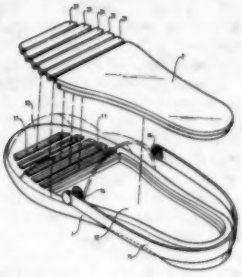
1. An apparatus for the conditioning of bulk material for the production of fibers or pulp for making paper, cardboard or fiberboards, comprising a silo with an inner cylindrical wall, a bottom defined within said silo and having at least one orifice, a clearing unit disposed within said silo, at least one discharge device arranged below said orifice, a plurality of fitting means for relieving said bulk material mounted above the lower third of said silo extending inwardly from the inner cylindrical wall and downwardly so that a space around a longitudinal axis of said silo remains free, said fitting means including lower flanges being adjacent to said cylindrical wall and forming

spaces therebetween, and steam nozzles passing through said cylindrical wall leading to said spaces.

4,930,231
SHOE SOLE STRUCTURE

Su H. Liu, No. 44-2, Lane 24, Shin Kang Rd., Lin-Ya Dist., Kaohsiung, Taiwan (809)

Filed Feb. 7, 1989, Ser. No. 306,907
Int. Cl.[5] A43B *13/02, 13/37, 13/42*
U.S. Cl. 36—30 A **4 Claims**

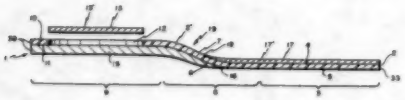


1. A shoe sole structure comprising:
a flexible sole having a front portion provided with a plurality of spaced parallel transverse grooves in an upper face thereof and wooden strips located in the grooves; and
a rear portion provided with a recess in an upper face thereof extending over a major portion of the rear portion and a wooden board located in the recess.

4,930,232
MULTILAYER SHOE SOLE

Norman Eagle, Cincinnati, Ohio, assignor to The United States Shoe Corporation, Cincinnati, Ohio

Filed Mar. 28, 1989, Ser. No. 329,557
Int. Cl.[5] A43B *13/38, 13/40*
U.S. Cl. 36—44 **10 Claims**

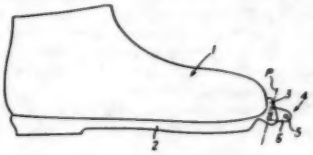


1. A multilayer shoe sole, comprising:
(A) an inner sole, having a top surface and a bottom surface, said inner sole including
(i) an insole board having a toe portion, a shank portion and a heel portion, each side portion having a top face and a bottom face;
(ii) an aperture formed in said heel portion of said insole board;
(iii) a heel cushion contained in said aperture, said cushion including an exposed surface;
(iv) a rigid heel support adhered to said insole board and extending from said bottom face of said heel portion to said bottom face of said shank portion; and
(v) a forefoot cushion, including an exposed surface, said cushion being adhered to said insole board and extending from said top face of said toe portion to said top face of said shank portion;
(B) a foam composite liner positioned on said top surface of said inner sole, said liner comprising
(i) a toe piece of a first polymeric foam material having a first Shore hardness value, said toe piece having a forward edge and a rearward edge, and,
(ii) a heel piece of a second polymeric foam material having a second Shore hardness value, said heel piece having a forward edge and a rearward edge, said forward edge of said heel piece being adhered to said rearward edge of said toe piece, said first Shore hardness value being higher than said second Shore hardness value; and
(C) means for adhering said foam composite liner to said top surface of said inner sole along the entire said exposed surface of said heel cushion, the entire said exposed surface of said forefoot cushion and said top face of said insole board.

4,930,233
SKI BOOT

Marc Provence, Thorens-les-Glieres, France, assignor to Salomon S.A., Annecy Cedex, France

Filed Feb. 2, 1989, Ser. No. 305,056
Claims priority, application France, Feb. 2, 1988, 88 01183
Int. Cl.[5] A43B *5/04;* **A63C** *9/20*
U.S. Cl. 36—117 **14 Claims**

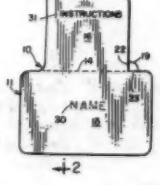


1. Cross-country ski boot having a sole of molded plastic material, said sole carrying, on its front end, fastening device having a transverse fastening axis, said fastening device cooperating with a binding mounted on a cross-country ski, said transverse fastening axis being unitary with an anchoring element embedded at least partially in said plastic material of said sole, wherein a part (**6***a;* **8***b,* **8***c;* **9***b,* **9***c;* **11***b,* **11***c*) of said anchoring element (**6, 8, 9, 11**) embedded in said plastic material of said front end of said sole (**2**) extends along a plane (P) sloping upward from back to front, and said transverse fastening axis is located at a lower portion of said anchoring element (**6, 8, 9, 11**).

4,930,234
FOLDABLE I.D. CARD

Eric Schmidt, Elgin, Ill., assignor to Wallace Computer Services, Inc., Hillside, Ill.

Filed May 8, 1989, Ser. No. 349,050
Int. Cl.[5] A44C *3/00*
U.S. Cl. 40—1.5 **10 Claims**



1. A breast pocket I.D. card comprising a unitary, foldable generally elongated panel equipped with a transversely-extending line of weakness intermediate the ends thereof to

define a name section on one side of said line and a pocket section on the other side thereof, each of said sections being generally rectangular with the transverse dimension of said name section being greater than the transverse dimension of said pocket section, one face of said panel being equipped with a transversely-extending name information space on said name section, the other face of said panel on said pocket section being equipped with a transversely extending band of pressure sensitive adhesive adjacent said line of weakening, and a release liner removably covering said adhesive whereby, when said release liner is removed, said panel is foldable on said line of weakness with said band of adhesive adhering the portion of said pocket section adjacent said line of weakness to the portion of said name section adjacent said line of weakness to develop a generally Y configuration tending to close to immobilize the folded panel in breast pocket mounting.

4,930,235

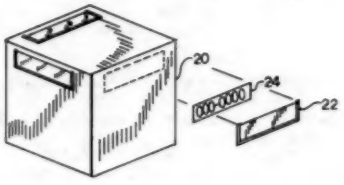
PHONE NUMBER DISPLAY DEVICE

Wendy N. Gillen, 246 Glenwood Ave., Glen Ellyn, Ill. 60137; Laurie N. Gavin, 0S 048 Pleasant Hill Rd., Wheaton, Ill. 60187, and Jean C. Neubauer, 303 N. Main St., Mount Prospect, Ill. 60056

Filed Feb. 1, 1988, Ser. No. 151,075

Int. Cl.[5] G09F *1/12*

U.S. Cl. 40—152 **4 Claims**



1. A phone number display device for displaying phone number bearing members in conjunction with pictures comprising:

a multi-sided structure of transparent walls;

an internal support member arranged to hold the pictures against said walls; and

pocket disposed on said walls for receiving said phone numbers bearing members.

4,930,236

PASSIVE INFRARED DISPLAY DEVICES

Frank J. Hart, 2811 Mark Ave., Santa Clara, Calif. 95051

Filed Nov. 29, 1988, Ser. No. 277,203

Int. Cl.[5] G09F *19/02*

U.S. Cl. 40—414 **10 Claims**

1. An automated advertising and display apparatus comprising:

a displaceable body,

means operable to shiftably move said body,

recognition and continuous tracking means,

electronic control means interconnecting said recognition and tracking means and said displaceable body, said continuous tracking means and electronic control means functioning by repetitive sampling and testing,

said recognition and tracking means including passive infrared sensing means recognizing the presence of a person within a prescribed range and field of view, Whereby such presence in said range and view actuates said operable means to move said body in a continuous tracking manner of said person.

4,930,237

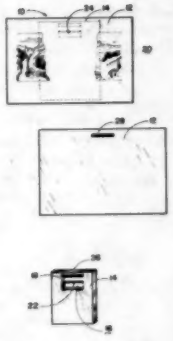
POSTER BOARD DISPLAY SYSTEM

Eric B. Oliphant, P.O. Box 3667, Santa Fe, N. Mex. 87504

Filed Nov. 21, 1984, Ser. No. 673,674

Int. Cl.[5] G09F *7/02*

U.S. Cl. 40—617 **3 Claims**



1. A poster board wall display apparatus comprising:

(a) an essentially planar foamed plastic support means of smaller dimensions than the poster board to be displayed and of thickness corresponding to the desired distance away from the wall that the poster board is to be held during display;

(b) an opening through the upper portion of said foamed plastic support means wherein the upper surface of said opening is an essentially flat surface sloped to one side forming a sharp edge against the wall during use such as to engage a fastener extending from the wall;

(c) a fastener means on the outer surface of said foamed plastic support means above said opening adapted to reversibly engage to and hold the poster board during display; and

(d) a poster board.

4,930,238

RIMFIRE FIREARM RECEIVER

Charles R. Poff, Jr., 811 S. Coulter, Bryan, Tex. 77801

Filed Apr. 21, 1988, Ser. No. 184,347

Int. Cl.[5] F41C *11/00*

U.S. Cl. 42—16 **31 Claims**

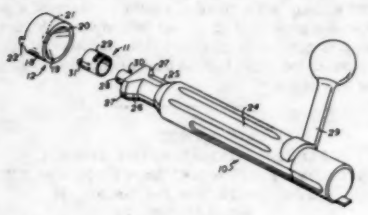
1. A receiver assembly for a firearm having an elongated longitudinal chamber adapted to receive a cylindrical barrel within one end thereof comprising;

means forming a bolt engaging opening in the longitudinal chamber of the receiver spaced axially from the inward end of the barrel to form a cylindrical cavity therebetween,

a bolt slidably and rotatably mounted in the longitudinal bore of the receiver and having a head portion at its front end adapted to be slidably received through said bolt

engaging opening and engaged therewith upon rotation, and

a non-rotating flexible cartridge feeding ramp installed in said cylindrical cavity between the inward end of the



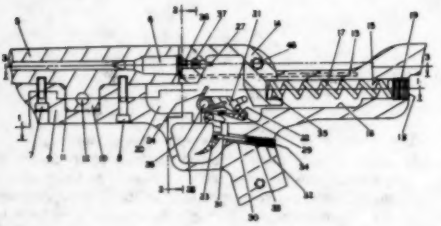
barrel and the bolt engaging opening and having a conical opening in axial alignment with the longitudinal bore of the barrel and the longitudinal axis of said bolt for guiding a live cartridge into the bore of the barrel.

4,930,239

DUAL ACTION (FUNCTION) INTEGRAL TARGET RIFLE

Gary R. Hunter, 2530 Oak Grove Pl., Toledo, Ohio 43613

Filed Jun. 27, 1989, Ser. No. 371,835
Int. Cl.[5] F41A *3/54*
U.S. Cl. 42—42.01 5 Claims



1. A semi-automatic single shot blow-back rifle comprising a barrel connected to a receiver and a stock forming a single piece having an upper horizontal stock member, a rear vertical stock member, a bottom horizontal stock member, and a pistol grip connected together so as to form a rectangular structure, said receiver having grooves, a bolt, and a cavity, said cavity in rear portion having a spring to urge said bolt against said barrel and in a middle portion housing a trigger, a sear, and a spring loaded hammer, said trigger having a wedge groove cooperating with said sear to release said hammer, said bolt having a hollow center to allow said hammer to strike a firing pin.

4,930,240

GUN BARREL CLEANING DEVICE

Kenneth R. Bice, 1042 Mo. Ave., Deerlodge, Mont. 59722

Filed Nov. 29, 1989, Ser. No. 442,632
Int. Cl.[5] F41A *29/02*
U.S. Cl. 42—95 9 Claims

1. A gun barrel cleaning device, comprising:

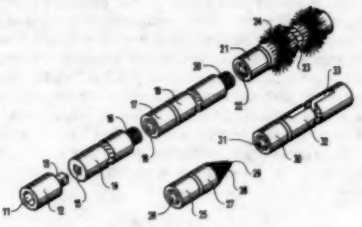
an elongated shaft;

a driving head at one end of said shaft dimensioned for engagement with a battery powered reversible electric motor;

an implement for removing contaminants from a gun barrel;

a first fastener on said shaft and a second cooperating fastener on said implement forming a rotary driving connection between said shaft and said implement;

one of said first and second fasteners comprising a reduced diameter externally threaded stub portion, an elongated non-circular aperture formed in said stub portions; and



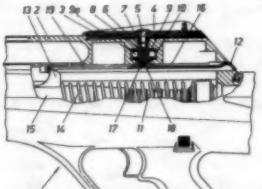
the other of said first and second fasteners comprising an elongated non-circular lug member dimensioned for insertion within said non-circular aperture, an internally threaded nut mounted for free relative rotation around said lug member and constrained against axial movement relative thereto, said nut configured for threaded engagement with said stub portion.

4,930,241

HAND-HELD FIREARM PROVIDED WITH A DETACHABLE SIGHT

Ulrich Zedrosser, Steyr, Austria, assignor to Steyr-Daimler-Puch AG, Vienna, Austria

Filed Sep. 7, 1989, Ser. No. 404,081
Claims priority, application Austria, Sep. 23, 1988, 2352/88
Int. Cl.[5] F41G *1/06, 1/38*
U.S. Cl. 42—100 9 Claims



1. In a hand-held firearm comprising

a receiver having a top surface,

an upwardly open track provided on said top surface and having an upwardly exposed bottom surface,

at least one bore, which is formed in said receiver and opens in said bottom surface, and

a detachable sight, which is slidably mounted in said track and is provided with at least one non-rotatable screw, which extends into said at least one bore,

the improvement residing in that

said receiver is formed with a laterally open, transverse slot, which intersects said bore,

a fixing nut is rotatably and axially slidably mounted in said bore and is screwed on said screw,

a knurled disc is disposed in said slot and is laterally accessible and is non-rotatably connected to said fixing nut and axially movable relative to said bore, and

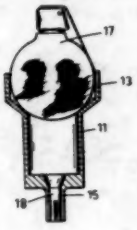
a spring is mounted in said receiver and biases said fixing nut in an upward direction in said bore.

4,930,242

VERSATILE GRENADE LAUNCHER

Jacob Bialy, Tel Aviv, Israel, assignor to ISPRA - Isreal Product Research Co. Ltd., Herzlia, Israel

Filed Sep. 8, 1988, Ser. No. 241,616
Claims priority, application Israel, Sep. 15, 1987, 83906
Int. Cl.[5] F41C *27/06*
U.S. Cl. 42—105 6 Claims



1. A grenade launcher, for use with a conventional military firearm, to accommodate a plurality of grenade sizes, the launcher comprising:

a hollow continuous barrel extension having a proximal end provided with attaching means thereon for connecting the barrel extension in sealed engagement with a barrel of the firearm to receive propellant gasses therefrom;

the barrel extension also having a distal end remote from the firearm;

the barrel extension formed into a plurality of cylindrical segments, with each of the segments larger in diameter than its next segment from the proximal end to the distal end;

at least two of the segments each sized to seat a similarly sized grenade, whereby different sizes of grenade can be hurled from the launcher;

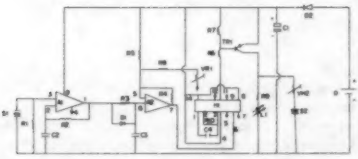
the barrel extension defining a distal rim shorter than the grenade, so that the last mentioned grenade projects therefrom to allow removal of the grenade safety pin from the last mentioned grenade prior to firing.

4,930,243

ANGLING BITE DETECTOR

Martin C. Lowe, 104 Moston Road, Shrewsbury, Shropshire, and Alan T. Lowe, Copperfield, The Crest, Old Park, Telford, Shropshire TF3 4TJ, both of United Kingdom

Filed Jul. 5, 1989, Ser. No. 375,635
Claims priority, application United Kingdom, Jul. 8, 1988, 8816259
Int. Cl.[5] A01K *97/12*
U.S. Cl. 43—17 12 Claims



1. An angling bite detector comprising a vibration or shock emitter which is adapted to be fitted at the top of a fishing rod and when actuated by the movement of the tip of the rod caused when a fish bites, sends vibration or shock signals along the rod, the detector further conuprising a receiver adapted to be situated in direct or indirect contact with the rod at a distance from the emitter and containing an electronic circuit including a sensor which receives the signals travelling from the emitter along the rod and converts them to electric signals which are processed in the circuit and used to actuate acoustic and/or visual warning means for alerting the angler, whereupon the circuit resets itself after a predetermined time.

4,930,244

APPARATUS FOR RETRIEVING LODGED FISHING LURES

Vernon L. Enwiller, 791 N. Comanche Dr., Chandler, Ariz. 85224

Filed Dec. 18, 1989, Ser. No. 451,868
Int. Cl.[5] A01K *97/00*
U.S. Cl. 43—17.2 3 Claims

1. In a fishing lure retriever of the class including:

(A) a generally cylindrical weighted main body having an upper end and a lower end;

(B) guide means adapted to slidably couple said lure retriever to a fishing line;

(C) engagement means integral with said retriever and adapted to engage a lodged lure accessed by coupling said lure retriever to a fishing line and permitting it to slide down the fishing line to the site of the lodged lure; and

(D) a cord fixed to the upper end of said main body to permit tugging said lure retriever after engagement has been made with a lodged lure to dislodge and retrieve it;

the improvement in which:

(E) said engagement means comprises a generally bulbous structure situated at said lower end of said main body, said generally bulbous structure being composed of a series of equatorially distributed loops of filament.

4,930,245

ARTIFICIAL SPOON-BAIT FOR FISHING

Guido Bazzano, Alessandria, Italy, assignor to Netts S.r.l., Casale, Monferrato, Italy

Filed Sep. 26, 1989, Ser. No. 412,915
Claims priority, application Italy, Oct. 13, 1988, 8617 A/88
Int. Cl.[5] A01K *93/00*
U.S. Cl. 43—42.17 5 Claims

1. Artificial spoon-bait for fishing, which is adapted to be connected to a line and comprises a connecting element for connection to the line, at least one hook connected to the connecting element, at least one spinning spoon carried by the connecting element, a container carried by the connecting element near the spinning spoon, insertion means for enabling substances intended to perform an attracting function of

ground-bait to be inserted in the container, and discharge means for dispensing the substances from the container in an adjustable manner the container comprising two parts which are coupled together axially for rotation relative to each other

and have respective holes which can be arranged in relative angular positions of variable aperture between an end position in which they are completely closed and an end position in which they are completely open, by the relative rotation of the two parts.

4,930,246

DOUBLE HOOK FISH LURE WITH ADJUSTABLE TRAILER HOOK

Roy D. Cunningham, Columbus, Miss., assignor to Southern Lure Company, Columbus, Miss.

Filed Jun. 28, 1989, Ser. No. 372,093
Int. Cl.[5] A01K 85/00
U.S. Cl. 43—42.28 **13 Claims**

1. A fish lure comprising:

a double hook having a forward end defined by a double hook eye, a double hook shank portion having a lengthwise extending axis extending rearwardly from said double hook eye and a rearward end defined by two diverging barbed hook portions;

a trailer hook having a barbed trailer hook portion defining its rearward extent and including a forwardly facing trailer hook barb, a trailer hook shank portion extending forwardly from said barbed trailer hook portion and having a forward end substantially perpendicular to said trailer shank portion proximate the forward end of said trailer hook shank portion remote from said barbed trailer hook portion, and

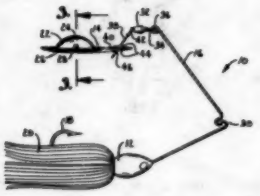
a trailer hook eye extending from the forward end of the trailer hook shank portion and disposed in a plane having a transverse component normal to said trailer hook shank portion with said trailer hook eye loosely surrounding said double hook shank portion for sliding motion along said double hook shank portion between an extended position engaging and reacting with said diverging barbed portions of the double hook in which said trailer hook shank portion is substantially parallel to said double hook shank portion and said trailer hook barb is spaced a maximum distance outwardly from the axis of said double hook shank to enhance the chances of hooking a striking fish and a retracted position in which the trailer hook eye is moveable forwardly from said diverging barbed members to permit said trailer hook to move to a retracted position in which the trailer hook shank portion is canted relative to said double hook shank means with the trailer hook barb being spaced a minimum distance from the axis of the double hook shank means so that it is somewhat shielded in place thereof to reduce the possibility of the trailer hook barb snagging weeds or other hazards during forward movement of the lure through a body of water.

4,930,247

FISHING LURE SPINNER BLADE WITH RATTLE CHAMBER

Eugene Dubois, Baker, La., assignor to Bass Pro Shops, Inc., Springfield, Mo.

Filed Jul. 3, 1989, Ser. No. 374,746
Int. Cl.[5] A01K 85/00
U.S. Cl. 43—42.31 **5 Claims**



1. A fishing lure comprising:

a lure body having a fishhook associated therewith;

a metal blade presenting therein a hollow rattle chamber having a generally hemispherical shape, said blade having a generally hemispherical dome and a base plate cooperating to define said rattle chamber;

a harness connecting said lure body and blade, said harness having means for receiving a fishing line on which the lure body and blade are to be carried; and

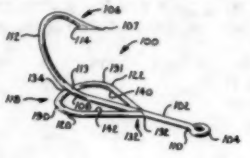
a metal pellet in said rattle chamber fitting loosely therein to rattle against said blade for generating a rattling sound when the lure body and blade move in the water;

4,930,248

SNAGGING HOOK

John B. Owens, P.O. Box 467, Camdenton, Mo. 65020

Filed May 3, 1989, Ser. No. 346,704
Int. Cl.[5] A01K 83/00
U.S. Cl. 43—43.16 **9 Claims**



6. A snagging hook comprising:

an elongated shank having first and second ends;

a hook element extending from said first end of said shank;

means on said shank for urging said hook in an upright position, said urging means comprising:

an equilateral triangular base with said shank passing as an altitude through a vertex and towards a side of said triangle to present first and second triangular bases on opposed sides of said shank;

means associated with said urging means to enhance a pur-

chase of said urging means on an underlying surface, wherein said enhancing means further comprises:

said triangular base presenting at least three points of contact with an underlying surface to enhance said purchase thereon; and

apertures in said bases to allow said hook to sink towards said surface and elements on said underlying surface to protrude through said bases, whereby to preclude said elements from interfering with said purchase of said triangular base;

means at said second end of said shank for connection to a line, whereupon said urging means obtains a purchase on an underlying surface and positions said hook in a normal position relative to said underlying surface upon tossing said hook in a body of water.

4,930,249

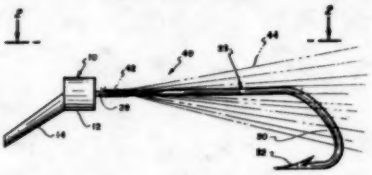
FISH HOOK FOR FLIES

Robert R. Johns, P.O. Box 7359, Oxnard, Calif. 93031

Division of Ser. No. 27,980, Mar. 19, 1987. This application Sep. 27, 1988, Ser. No. 250,161

Int. Cl.[5] A01K *83/00, 85/08*

U.S. Cl. 43—43.16 **8 Claims**



1. A hook for use in tying a fishing fly comprising in combination:

a unitary, metal shank having a straight mid-section, a first end and a second end;

the first end having a generally U-shaped bend forming a tapered segment generally parallel to and spaced from the straight mid-section of the shank and terminating a in a first point;

the second end being uniformly tapered to a second point and being bent at a position inward from said point to form a round loop in the same plane as said shank and having an eye for receiving fishing line and a straight portion past the loop disposed alongside the shank, said straight portion and shaft having a juncture and past the juncture the straight section and adjacent shaft uniformly tapering until the point blends with the shank;

whereby on wrapping fly tying filamentary material around the tapered straight portion and adjacent shank and across said juncture, a band of said material is formed, preventing entry of said fishing line into said juncture.

4,930,250

TROTLINE STORAGE REEL

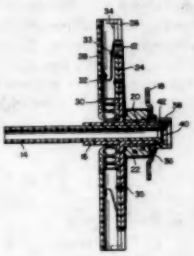
Raymond M. Carson, Rte. 1, Box 4, Faxon, Okla. 73540

Filed Sep. 5, 1989, Ser. No. 402,452

Int. Cl.[5] A01K *97/00*

U.S. Cl. 43—57.3 **8 Claims**

1. A trotline storage reel comprising a substantially circular disc having a plurality of radial notches spaced circumferentially around the periphery thereof, a hub for rotatably supporting the disc from a support, said hub including means to receive a trotline being wound thereon with leader lines extending radially of the disc and received in the notches, a plurality of radially disposed, circumferentially spaced cages mounted on the disc on the opposite side from the hub to receive the hooks on the ends of the leader lines, each cage including a notch receiving the leader line with the notch in the cage being aligned with the notch in the periphery of the disc and receiving but not gripping the leader line with the fishhook eye being disposed at the inner end of the notches to



enable the fishhooks to fall out of the cages when unwinding the trotline with the leader line of the respective hook being removed from the notches as the trotline is unwound.

4,930,251

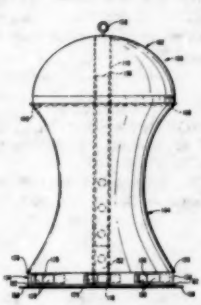
INSECT TRAP

Joseph S. Crisanti, 16 Ladwood Dr., Holmdel, N.J. 07733

Filed May 31, 1989, Ser. No. 359,732

Int. Cl.[5] A01M *1/20*

U.S. Cl. 43—107 **19 Claims**



1. An insect trap comprising a housing having a base and a top, said top moveable relative to said base to provide an opening communicating with the interior of said housing, attraction odor producing means within said housing being at least partially exposed to the interior of said housing upon movement of said top to provide said opening, and a pair of telescopically arranged members within said housing and respectively attached to said top and said base, said members permitting movement of said top relative to said base between an open and closed position, said top when in said open position providing said opening in communication with the interior of said housing.

4,930,252

CHRISTMAS TREE WATERER

Vernon E. Krause, 505 N. 27th, and Timothy J. Davis, R.R., both of Norfolk, Nebr. 68701

Filed Feb. 9, 1989, Ser. No. 307,919

Int. Cl.[5] A47G *7/02;* **A01G** *31/00*

U.S. Cl. 47—40.5 **7 Claims**

1. In combination:

a tree stand having a water reservoir;

an upstanding water supply support means having upper and lower ends;

a water container positioned on the upper end of said support means and having a horizontally disposed bottom wall positioned above the lower end of the support means, and an upstanding side wall means, said bottom wall having an opening formed therein;

a normally closed electrically operated water valve means positioned below said bottom wall and having an inlet side in operative fluid communication with said opening;

a water level monitor positioned within said reservoir;

an electrical control means operatively connected between said water level monitor and said water valve means, for opening said water valve means when the water in said reservoir drops to a first predetermined level;

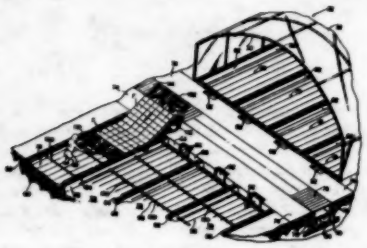
said electrical control means adapted to open said water valve means when the water in said reservoir drops to a predetermined level and to close said water valve means when the water in said reservoir raises to a second predetermined level.

4,930,253

PLANT GROWING AND HANDLING METHOD

George K. Todd, Sr., Ruskin, Fla., assignor to Speedling Incorporated, Sun City, Fla.

Division of Ser. No. 831,914, Feb. 20, 1986, Pat. No. 4,793,096.
This application Oct. 5, 1988, Ser. No. 256,390
Int. Cl.[5] A01G *31/02*
U.S. Cl. 47—65 9 Claims



1. A method of handling plant flats comprising the steps of:

(a) providing a plurality of floatable plant flats arranged in an array of longitudinal and lateral rows, each of the plant flats including a plurality of open-bottomed plant receiving cells containing growing media and seedling plants therein;

(b) providing channel means for receiving the floatable plant flats in an array of longitudinal and lateral rows;

(c) providing reversible conveyor means adjacent the channel means and selectively operable in first and second directions for selectively moving the floatable plant flats into or out of the channel means, respectively;

(d) filling the channel means with a liquid;

(e) positioning the array of floatable plant flats on a work area adjacent the liquid-containing channel means;

(f) activating the conveyor means to operate in its first direction to serially deposit successive lateral rows of the floatable plant flats into the liquid-containing channel means, each lateral row pushing previously deposited lateral rows outwardly away from the work area;

(g) exerting light force against the first-deposited lateral row of the floatable plant flats in a direction inwardly towards the work area to maintain the lateral alignment of the lateral rows of the floatable plant flats, while performing step (f); and

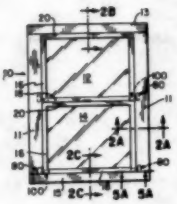
(h) subsequently activating the conveyor means to operate in its second direction while simultaneously maintaining the light force of step (g) to effect serial removal of successive lateral rows of the floatable plant flats from the liquid-containing channels means in reverse order from which they were deposited.

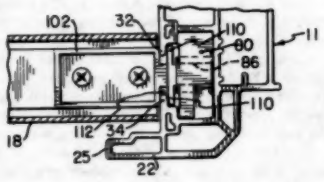
4,930,254

LOCK FOR SLIDER MECHANISM

Siegfried W. Valentin, Melrose Dr., Chester, N.J. 07930

Filed Oct. 17, 1988, Ser. No. 258,567
Int. Cl.[5] E05D *15/22*
U.S. Cl. 49—181 5 Claims





1. A slide mechanism for sliding a first piece relative to a second piece having an elongated channel with at least one lip overlying the channel, comprising

a carriage of low friction material for sliding within and along said channel, said carriage having a rotatable member with an aperture which is rotatable from a first position to a second position,

a connector having a central body portion fixedly attached to said first piece and a post extending outwardly from said central body to extend into said channel and into the aperture of the carriage rotatable member to couple said connector to said carriage and to provide for rotation of the rotatable member from a first to a second portion upon rotation of said first piece, and

a pair of arms one extending outwardly from each side of said connector post with a space between the arms and the connector body so that the channel lip lies in said space and an arm lies behind the lip of the channel in the channel when the carriage rotatable member is in its first position and the first piece is free for being moved along the length

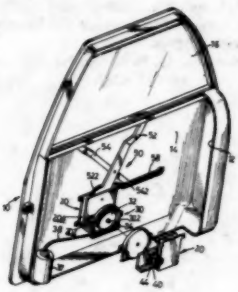
of the channel of said second piece with the connector extending arm riding behind the channel lip for preventing the first piece from falling out of the channel by an arm engaging said lip, the carriage rotatable member when said first piece has been rotated to place the carriage rotatable member in its second position aligning the connector extending arms to be along the length of the channel so that the first piece can be detached from said carriage and moved past the lip of the channel.

4,930,255

DOOR WINDOW ASSEMBLY

Ho T. Sen, No, 4, Lane 21, Hou Chuang Rd., Taichung City, Taiwan, R. O. C., Taiwan

Filed May 23, 1989, Ser. No. 355,336
Int. Cl.[5] E05C 7/02
U.S. Cl. 49—63 6 Claims



1. A door window assembly for mounting on the inside of a car door (10), the car door (10) having inner walls (12,14), said door window assembly comprising:

a pair of frames (20) being respectively fixed on first and second inner walls (12, 14) of the car door (10);

a main driving means (30) having a worm wheel (32) in mesh with a worm (34), said worm wheel (32) being rotatably supported by said pair of frames (20), said worm (34) being rotated by a motor (37) so as to drive said worm wheel (32);

a first and a second pinions (40, 42) being respectively rotatably mounted on said pair of frames (20) at opposite sides of said worm wheel (32), a first and a second clutches (44, 46), said first and second pinions (40,42) each being selectively engageable with and rotatable by said worm wheel (32) through a corresponding clutch (44, 46); said first and second clutches (44, 46) being selectively driven by said worm wheel (32); and

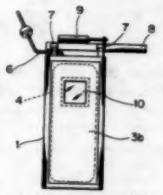
at least two raising means (50), each means (50) for raising and lowering a glass plate (16, 16') supported thereon, said raising means (50) each comprising a toothed element (52) and a secondary element (54) pivotally connected together, each said toothed element (52) being rotatably mounted on one of said frames (20) and being rotatable by a corresponding pinion (40, 42), said secondary element (54) comprising a lower end (542) and an upper end (544) slidably disposed within a stationary guide rail (56) and a movable support rail (58), respectively.

4,930,256

METHOD OF SMOOTHING THE OUTER SURFACE OF A STRUCTURE WITH SLIDING DOORS AND A SLIDING DOOR WITH A MECHANISM FOR SMOOTHING THE OUTER SURFACE

Isamu Kawanishi, and Makoto Ogawara, both of Hyogo, Japan, assignors to Kawasaki Jukogyo Kabushiki Kaisha, Hyogo, Japan

Filed Sep. 1, 1988, Ser. No. 239,243
Int. Cl.[5] E05D 15/10
U.S. Cl. 49—209 20 Claims



1. A door system, comprising:

a fixed structure having means defining a doorway therein, and an outer surface;

a door body slidably disposed, with respect to said doorway of said fixed structure, between first open and second closed positions;

means defining an opening within said door body for alignment with said doorway of said fixed structure when said door body is disposed at said second closed position;

an outer wall member movably disposed upon said door body between first projected and second retracted positions with respect to said opening of said door body, and including an outer surface having a size and shape substantially corresponding to that of said doorway such that when said door body is disposed at said second closed position and said outer wall member is disposed at said first projected position, said outer surface of said outer wall member will be disposed substantially flush with said outer surface of said fixed structure; and

air bag means mounted upon said door body and interposed between said door body and said outer wall member for moving said outer wall member between said projected and retracted positions when said air bag means is inflated and deflated, respectively.

4,930,257

THERMAL BREAK DOOR FRAME ASSEMBLY

William P. Windgassen, Huntley, Ill., assignor to National Material Limited Partnership, Ill.

Filed Feb. 21, 1989, Ser. No. 312,721
Int. Cl.[5] E06B 1/04
U.S. Cl. 49—504 20 Claims

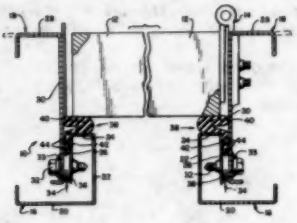
1. A thermal break door frame assembly, comprising:

a first metal frame member having a soffit, a stop along one side of the soffit and a return flange extending from the stop behind and lengthwise of the soffit;

a second metal frame member having a rabbet combining

with said return flange to define a groove therebetween and extending lengthwise of the frame assembly; and

a unitary weatherstrip adapted to engage along the stop of



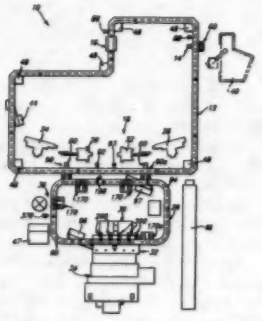
the first frame member and the rabbet of the second frame member and including an integral thermal break tail projecting into the groove between the rabbet and the return flange of the first frame member.

4,930,258

INTEGRATED BUFFING AND GRINDING SYSTEM

Don F. Carlson, Bloomfield Hills, Mich., assignor to Acme Manufacturing Company, Madison Heights, Mich.

Filed Nov. 9, 1988, Ser. No. 269,473
Int. Cl.[5] B24B 1/00
U.S. Cl. 51—5 R 7 Claims



1. An integrated finishing system for performing multiple finishing operations, comprising:

first conveyor means for transferring a plurality of articles from a loading station to a first work station in series;

first pallet means for supporting an article upon said first conveyor means;

at least one first stopping means located along said first conveyor means at said frist work station for stopping said first pallet means to allow said articles to be removed from said first conveyor means;

a first finishing device at said first work station;

robot means at said first work station for individually removing stopped said articles from said first conveyor means and guiding each of said articles into and out of engagement with said first finishing device;

second conveyor means spaced adjacent said first work station for transferring articles to a second work station and from said second work station to an unloading station in series;

a second finishing device at said second work station;

second pallet means for supporting the finished article upon said second conveyor means;

at least one second stopping means located along said second conveyor means opposite said first work station for stopping said second pallet means and allowing finished articles to be loaded on said second pallet means, said robot means transferring each of the finished articles from said first work station to said second pallet means upon said second conveyor means at said second stopping means; and

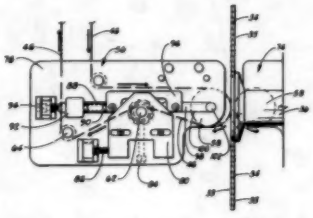
shuttle means for transferring a predetermined number of said articles between said second finishing device and said second conveyor means.

4,930,259

MAGNETIC DISK SUBSTRATE POLISHING ASSEMBLY

Dennis E. Kobylenski, St. Anthony, and Loren W. Boehner, Maple Plain, both of Minn., assignors to Magnetic Perpherals Inc., Minneapolis, Minn.

Filed Feb. 19, 1988, Ser. No. 157,824
Int. Cl.[5] B24B 21/12
U.S. Cl. 51—89 4 Claims



1. A magnetic substrate blank polishing assembly for polishing a surface of a disk substrate as the disk substrate is rotated, the assembly comprising:

an assembly housing;

a polish roller having a roller shaft with a first end and a second end rotatably mounted on the assembly housing, the polish roller disposed adjacent the surface of the disk substrate;

a polish tape received on the polish roller;

polish tape feed means for feeding the tape onto the polish roller;

polish tape take up means for taking up the tape after the polish tape is fed onto the polish roller; and

biasing means mounted on the assembly housing for engaging the first and second ends of the roller shaft and urging the polish roller toward the surface of the disk substrate with the polish tape therebetween, the biasing means comprising:

a pair of coil springs mounted on, and received in slots in, the assembly housing for applying a bias force to the first and second ends of the roller shaft; and

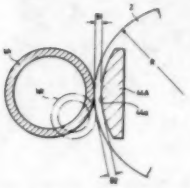
a pair of transfer yokes attached to slot pins mounted in the assembly housing, one end of each of the coil springs engaging the transfer yokes, the slot pins engaging the first and second ends of the roller shaft.

4,930,260

CENTERLESS GRINDING APPARATUS OF THROUGH-FEED TYPE

Susumu Itoh; Kazuo Satoh, and Tomonori Sakuma, all of Fukushima, Japan, assignors to Akebono Brake Industry Co., Ltd., Tokyo, Japan

Filed Nov. 18, 1988, Ser. No. 269,283
Claims priority, application Japan, Nov. 18, 1987, 62-176134[U]
Int. Cl.[5] B24B 5/18, 5/22
U.S. Cl. 51—103 TF 9 Claims



1. A centerless grinding apparatus for grinding a work, comprising:

a grinding wheel;

a regulating feed wheel disposed at an opposed position to said grinding wheel;

a first and second guide plates provided at a side of said grinding wheel, said first and second guide plates having a first guide surface from which said grinding wheel protrudes by a grinding width; and

a third and fourth guide plates provided at a side of said regulating feed wheel, said third and fourth guide plates having a second guide surface from which said regulating feed wheel protrudes by a feed width, said second guide surface being curved into a curvature equal to a curvature of the outer periphery of said regulating feed wheel,

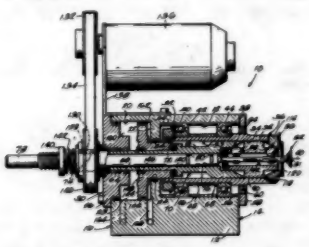
wherein the work is guided by said first to fourth guide plates and introduced between said grinding wheel and said regulating feed wheel whereby feeding the work in a direction of the axis of said work.

4,930,261

VALVE RESURFACING APPARATUS AND METHOD FOR MAKING THE SAME

Mark D. Tiegs, and Michael J. Kurten, both of Winona, Minn., assignors to Hein-Werner Corporation, Waukesha, Wis.

Continuation of Ser. No. 160,128, Feb. 25, 1988, abandoned. This application Sep. 6, 1989, Ser. No. 404,058
Int. Cl.[5] B23C 3/05
U.S. Cl. 51—105 VG 30 Claims



30. An apparatus for engaging the stem of a valve member and for rotating the valve member about an axis, said apparatus comprising

a housing,

bearing means within said housing

a sleeve member supported by said bearing means for rotation about an axis, said sleeve member having therein a cylindrical bore centered on said axis and machined for rotating said sleeve member about said axis,

a spindle slideably housed within said bore for movement relative to said sleeve member along said axis, said spindle including a first inner surface defining a frustoconical bore centered on said axis, said first inner surface being machined by rotating said spindle in said sleeve and about said axis,

a collar mounted on said sleeve member for common rotation with said sleeve member about said axis, said collar including a second inner surface defining a second frustoconical bore centered on said axis, said second inner surface being machined by rotating said sleeve member and said collar about said axis,

a bearing member carriage means housed in said cylindrical bore between said first inner surface and said second inner surface,

first and second axially spaced sets of bearing members located within said bore and supported by said bearing member carriage, said first set of bearing members being supported by said carriage for radial movement relative to said sleeve member, said first surface being engageable with said first set of bearing members to force said bearing members against the stem of a valve member when the spindle moves toward the collar, and the second set of bearing members being supported by the carriage for radial movement relative to said sleeve member, said second inner surface being engageable with the second set of bearing members to force said bearing members against the stem of a valve member when the spinkle moves toward the collar,

means for moving said spindle relative to said sleeve member and along said axis so that said first inner surface on said spindle engages said first set of bearing members and so that said second inner surface on said collar engages said second set of bearing members, and

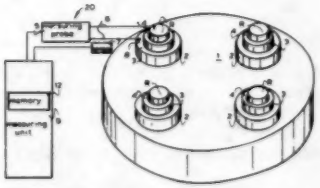
means for rotating said spindle about said axis.

4,930,262

CONTROL SYSTEM FOR SURFACE GRINDING OF LIKE WORKPIECE BLANKS

Jürgen Sennewald, Solingen, Fed. Rep. of Germany, assignor to Maschinenfabrik Ernst Thielenhaus GmbH, Wuppertal, Fed. Rep. of Germany

Filed Dec. 13, 1988, Ser. No. 283,606
Claims priority, application Fed. Rep. of Germany, Dec. 19, 1987, 3743275
Int. Cl.[5] B24B 49/00
U.S. Cl. 51—165.74 3 Claims



1. In a control process for surface grinding of a plurality of substantially like workpiece blanks to a predetermined accuracy in a precision grinding machine, which has a plurality of spindles each with a workpiece receiving component and a workpiece mount on a switchable spindle head, said control

process having a control apparatus comprising a measuring sensor and an electronic measuring unit, in which said measuring sensor determines an actual height value of a workpiece blank to be worked relative to a reference point of the appropriate one of said spindles and in which said actual height value is fed to said measuring unit and said measuring unit controls said surface grinding considering said actual height value, the improvement wherein said measuring unit is associated with at least one reference workpiece of a predetermined thickness being geometrically similar to said workpiece blanks to be worked which rests on individual ones of said workpiece mounts and is measured in substantially the same way on each of said workpiece mounts as said workpiece blanks, said measuring unit has a memory to which a plurality of height measurements of said reference workpiece for said individual workpiece mounts relative to said reference points are fed as setpoint values and said measuring unit compares said actual height values of said workpiece blanks on said workpiece mounts with said setpoint values fed to said memory for said individual workpiece mounts and according to the difference between said actual height values and said setpoint values controls said surface grinding of said workpiece blanks, and wherein said measuring unit additionally detects variation in length of said spindles relative to said spindle head.

4,930,263

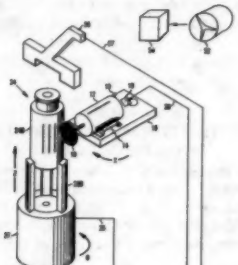
FORMING MARKINGS ON A VIAL SURFACE

Joseph F. Rando, Los Altos Hills, Calif., assignor to Spectra-Physics, Inc., San Jose, Calif.

Filed May 18, 1989, Ser. No. 353,718

Int. Cl.[5] B24B *49/00*

U.S. Cl. 51—165.71 **28 Claims**



15. A method of forming a bar code having a plurality of non- reflecting lines in a cylindrical surface of a transparent object comprising the steps of:

providing the object;

rotating the object around an axis of the cylindrical surface; and

grinding a plurality of spaced apart lines in the cylindrical surface of the object by a grinding wheel;

wherein the axis of the cylindrical surface is parallel to a tangent of the grinding wheel at a point at which the grinding wheel contacts the surface; and

the spaces between the lines comprise the non-reflecting lines of the bar code.

4,930,264

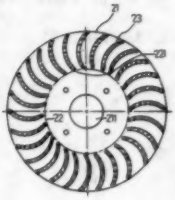
POLISHING DEVICE

Kan-Chi Huang, No. 3 Alley 3, Lane 1512, Chung Shan Road, Tao Yuan City, Taiwan

Filed Sep. 26, 1989, Ser. No. 412,482

Int. Cl.[5] B24B *23/02, 55/06*

U.S. Cl. 51—170 T **2 Claims**



1. A grinding type polishing device comprising a top cover, a debris-intaking rotor, a driving shaft, a cushion plate, an intermediate casing, a lower casing and a polishing plate; wherein said top cover is equipped with a pneumatically operated motor associated with a high pressure air inlet port through which high pressure air is introduced to actuate said pneumatic motor; a valve control stick is used to control the air flow into said pneumatic motor; said driving shaft is engaged with said pneumatic motor in said top cover; and said debris intaking rotor is attached to said driving shaft and rotates with the same; said cushion plate in cooperation with said intermediate casing is disposed under said top cover to form a first air chamber with said rotor rotatably located therein; said lower casing is disposed partially externally over said intermediate casing so to form a second air chamber with said polishing plate rotatably located therein; said polishing plate having a number of through holes is provided with a central threaded rod which is engaged with the bottom end of said driving shaft so that said polishing plate will rotate therewith; a plurality of spaced arcuate blade protrusions are disposed on the top side of said polishing plate so that when said polishing plate is rotated in said second air chamber, an air pressure differential is produced as a result of the rotation of said polishing plate and said debris-intaking rotor so to permit the debris produced in grinding process to be sucked into the second air chamber through the holes on said polishing plate and into said a first air chamber and moving into said debris-intaking rotor which will discharge the debris out of said top cover by way of centrifugal force through an outlet port on said top cover.

4,930,265

THREAD GRINDING METHOD AND MACHINE

Heinz Belthle, Aichwald, Fed. Rep. of Germany, assignor to Schaudt Maschinenbau GmbH, Stuttgart, Fed. Rep. of Germany

Filed Aug. 20, 1985, Ser. No. 767,344

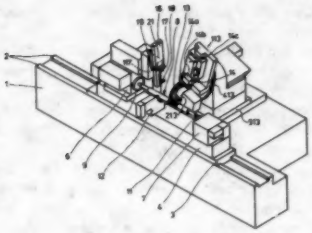
Claims priority, application Fed. Rep. of Germany, Aug. 28, 1984, 3431506

Int. Cl.[5] B23G *1/36*

U.S. Cl. 51—288 **21 Claims**

1. A method of grinding threads into the cylindrical peripheral surface of a workpiece, comprising the steps of rotating the workpiece about its axis; subjecting the peripheral surface of the rotating workpiece to a first grinding action so as to reduce the diameter of the peripheral surface to a preselected value; simultaneously subjecting the rotating workpiece to a second grinding action to provide the peripheral surface with at least one thread, including contacting the workpiece with a driven grinding tool having a predetermined profile; keeping such profile from changing in the course of said second grind-

ing action; monitoring the diameter of freshly ground portions of the peripheral surface in the course of said first grinding



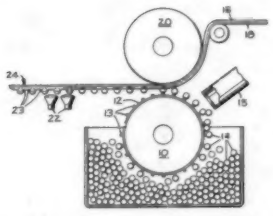
action; and modifying said first grinding action when the monitored diameter deviates from said preselected value.

4,930,266

ABRASIVE SHEETING HAVING INDIVIDUALLY POSITIONED ABRASIVE GRANULES

Clyde D. Calhoun, Grant Township, Washington County, Minn.; George D. Foss, Amery, Wis.; Maurice J. Fleming, Cottage Grove, and Wesley J. Bruxvoort, Woodbury, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 160,776, Feb. 26, 1988, abandoned.
This application May 19, 1989, Ser. No. 355,893
Int. Cl.[5] B24D *3/00*
U.S. Cl. 51—293 **21 Claims**



1. Abrasive sheeting comprising a backing carrying a binder layer of substantially uniform thickness in which individually positioned abrasive granules are strongly bonded and lie substantially in a plane and at a predetermined lateral spacing between granules, said granules being of substantially equal size and passing a screen with 300 μm openings, and a portion of virtually every granule protruding from the surface of the binder layer.

4,930,267

SANDING RASP

Douglas B. Hill, Marietta, and Fredrick J. Newell, Jr., Norcross, both of Ga., assignors to Demand Products, Inc., Smyrna, Ga.

Filed May 4, 1989, Ser. No. 347,346
Int. Cl.[5] B24D *15/00*
U.S. Cl. 51—392 **6 Claims**

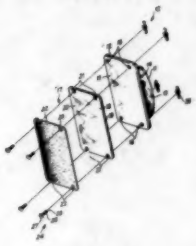
1. A sanding rasp for sanding abutting, expanded polystyrene building panels which are arranged to define a building surface, comprising:

(a) a handle means for grasping said rasp;

(b) a support plate having a flat lower surface, secured to said handle means;

(c) a rigid substrate having a first surface and a second surface, releasable mounted along its first surface to the lower surface of said support plate wherein said substrate defines notches alone one or more of its edges for communicating with said mounting means;

(d) sandpaper attached to the second surface of said substrate, whereby said sandpaper is immovable on said sub-



strate when said sanding rasp is used for sanding said building surface; and

(e) mounting means attached to said support plate for releasably mounting said substrate to said support plate, whereby said substrate can be readily removed and installed onto said support plate.

4,930,268

APPARATUS FOR ASSEMBLING A ROOF FRAME WITH A POST, FOR MAKING FRAMEWORK AND STRUCTURES

Andre Fritz, Beinheim, and Jean Gerlinger, Geudertheim, both of France, assignors to Bator S.A., Societe Anonyme, Reichstett, France

Filed Jul. 27, 1988, Ser. No. 224,704
Claims priority, application France, Jul. 27, 1987, 87 10718
Int. Cl.[5] E04B *7/02*
U.S. Cl. 52—90 **10 Claims**

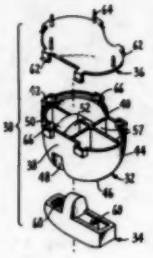
1. Assembly device for a roof frame having a hollow inclined roof beam, with a hollow post, for making framework and structures, characterized in that it consists of two cast members (1 and 2) separate from the hollow roof beam and the hollow post, one (1) being disposed fixedly in the interior of the lower end of the hollow roof beam (3), and the other (2) being disposed fixedly partially within the interior of the upper end of the hollow post (4), the two members having means (5, 6, 7, 8) securing them together at two spaced locations, the distance between said locations being greater than the width of the post (4), the two members (1 and 2) coacting to ensure assembly and securement of the roof beam (3) with the post (4) by mere engagement of said securing means (5, 6, 7, 8).

4,930,269

APPARATUS AND METHOD FOR LIFTING TILT-UP WALL CONSTRUCTIONS

David L. Kelly, and Steven A. Bennetts, both of Sacramento, Calif., assignors to The Burke Company, Sacramento, Calif.

Filed Mar. 22, 1989, Ser. No. 327,313
Int. Cl.[5] E02H *12/34*
U.S. Cl. 52—125.5 8 Claims



1. An apparatus for raising a concrete tilt-up slab comprising:

a wire anchor imbedded in the slab and having an apex accessible through a recess formed in the slab, said anchor of inverted v-shaped configuration, having a first and a second leg joined at an apex and lying within a first plane, the legs having distal tips extending laterally out of the first plane;

two anchor bases for supporting and positioning said wire anchor within the slab, said anchor bases connected to said distal tips and lying in a second plane perpendicular to the first plane;

a clutch assembly having a housing configured for receipt over the apex of said wire anchor, said housing enclosing a linear engaging pin slidably mounted therein to slide under and engage the anchor;

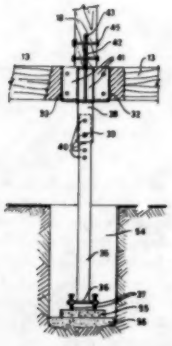
and means for hoisting the clutch assembly.

4,930,270

BUILDING SYSTEMS

Aldo Bevacqua, Cnr. Minchinton Street and The Esplanade, Bulcock Beach, Caloundra, Qld. 4551, Australia

Continuation of Ser. No. 91,787, Sep. 1, 1987, abandoned. This application Oct. 27, 1989, Ser. No. 428,465
Int. Cl.[5] E04F *15/024*; E04G *1/00*
U.S. Cl. 52—126.1 7 Claims



1. An elevated base structure for a dwelling, said base structure being of the type having a plurality of post assemblies, floor supporting beams extending between said post assemblies, and wall framing extending above said floor supporting beams and being anchored to said post assemblies, characterized in that each said post assembly includes:

an elongate lower post having a foot portion supported on a supporting pad,

an upper post including floor mounting brackets, said floor mounting brackets being attachable to opposed ends of adjacent floor beams;

said upper post being telescopically and releasably engaged about said lower post and adjustable stepwise along an upper portion of said post;

releasable locking means disposed between said lower post and said upper post for locking said post assembly at a selected length, and

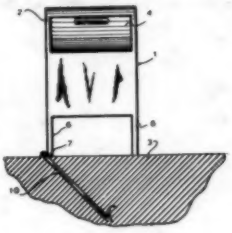
three screw adjusters mounted in horizontally spaced relationship on said foot portion and being extendible away from said lower post for engagement with said support pad supporting said post assembly whereby the inclination of said lower post may be adjusted and the height of said lower post may be adjusted through a range at least equal to one step of said stepwise adjustment.

4,930,271

ANCHORING MEMBER FOR AN OUTDOOR CONTAINER ESPECIALLY AN OUTDOOR MAILBOX

Anthony Pizzichemi, 234 Waverly Ave., Patchogue, N.Y. 11772

Filed Dec. 27, 1988, Ser. No. 289,696
Int. Cl.[5] E02D *5/74*
U.S. Cl. 52—155 2 Claims



1. An anchoring member for securing an outdoor container, especially an outdoor mailbox, to the ground comprising:

a shank made of an angle iron piece having two connected plate portions which are oriented at about a right angle to each other, a knife edge being provided on the bottom end of each of said plate portions inclined to the longitudinal direction of said shank which comes to a point for an easier penetration of said ground;

a pivotable substantially flat connector plate attachable to said shank in the vicinity of the upper end of said shank and to said container; and

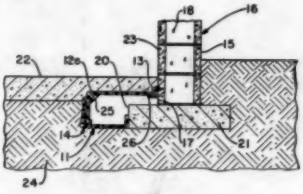
two pivotable securing arms, each of which is pivotally attached to said shank in the vicinity of the lower end of said shank pivotable between a folded in position against said shank and a deployed position extended outward to restrain said shank from being drawn from said ground and is made from a substantially flat metal piece which is twisted to form a knife portion having a knife edge on a bottom end thereof and an earth-bearing portion whose upper surface is substantially perpendicular to said knife portion which is pivotally mounted on a pivot rigidly attached to said shank with two bearing washers attached to said pivot bearing on opposite sides of said knife portion, said knife edge of said knife portion being oriented at an acute angle to the longitudinal direction of said knife portion to form a stop for said pivotable securing arm in said deployed position.

4,930,272

DRAIN SYSTEM

Joseph Bevilacqua, Akron, Ohio, assignor to B-Dry Systems, Copley, Ohio

Filed Nov. 4, 1988, Ser. No. 267,437
Int. Cl.[5] E02D 19/00
U.S. Cl. 52—169.5 9 Claims



1. A foundation wall drainage system comprising:

a footer wall;

an earthen drainage trench having a top, a bottom, a first side, and a second side wherein said trench functions as a conduit for drainage water passing through said system; and

a wall formed of hollow building blocks provided with connecting openings through a top and a bottom thereof, said blocks being disposed vertically on top of each other, with a lowermost row of said blocks having spaced holes penetrating an inner wall side thereof which function as drainage passageways, said spaced holes being located substantially adjacent said drainage trench wherein the improvement comprises;

a drainage trench lower-lining member, wherein said lower-lining member is disposed on said bottom of said trench extending across the entire bottom of said trench and extending partially up said footer wall and up said second side of said trench; and

a drainage trench upper-lining member wherein said upper-lining member is supported from said inner wall side, above said spaced holes, at one end, while a second end rests on said lower-lining member,

said trench being faced on said first side thereof by said footer wall, on said second side and said top thereof by said upper lining member and on said bottom thereof by said lower lining member.

4,930,273

MULTILEVEL MODULAR BUILDING WITH SCISSOR STAIRS AND METHOD OF ASSEMBLY

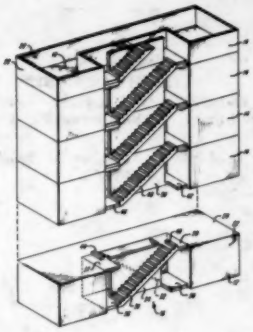
Peter P. Papesch, Boston, Mass., assignor to Modulex, Inc., Boston, Mass.

Continuation-in-part of Ser. No. 216,518, Jul. 6, 1988, abandoned. This application Mar. 24, 1989, Ser. No. 328,526
Int. Cl.[5] E04F 11/00
U.S. Cl. 52—79.1 25 Claims

1. A modular building comprising:

a plurality of modules, each module comprising a floor, a ceiling, and walls, some of the plurality of modules disposed in a lower level and others of the plurality of modules disposed in an upper level vertically adjacent to the lower level to form a module stack; and

pairs of stairways installed into said module stack and connected to and extending between the floors of the modules on the lower level and the floors of the modules on the upper level, each pair of stairways disposed adjacently in parallel vertical planes and configured in an X shape, each stairway of each pair comprising a single flight of stairs



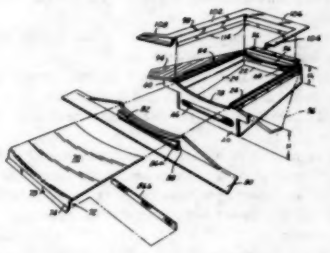
and providing a separate access to the modules on the upper level.

4,930,274

SKYLIGHT FRAME AND PANEL ASSEMBLY

Peter A. Cummings, 655 Pine St., Harbor Springs, Mich. 49740, and Ronald E. Sears, 860 Helston, Bloomfield Hills, Mich. 48013

PCT No. PCT/US87/00827, § 371 Date Jan. 9, 1989, § 102(e) Date Jan. 9, 1989, PCT Pub. No. WO88/08062, PCT Pub. Date Oct. 20, 1988
PCT Filed Apr. 4, 1987, Ser. No. 331,667
Int. Cl.[5] E04B 7/18
U.S. Cl. 52—200 5 Claims



1. A skylight frame and panel assembly for mounting in a roof aperture comprising, in combination:

a generally rectangular box-like frame having a header, side and bottom rails, with the side and header rails having inwardly opening skylight panel receiving channels;

means for overlying the roof margins adjacent the aperture to support the frame therein including portions of the bottom rail projecting laterally beyond the side rails;

a flexible skirt overlying the bottom rail and the projecting portions thereof for extending over the roof;

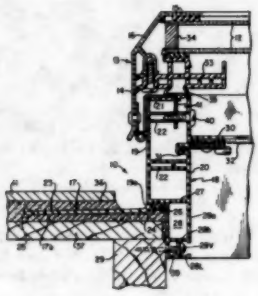
laterally extending generally triangularly shaped flaring pieces overlying the side rails and said skirt for extending over the roof and beneath the roof covering;

roofing nail impervious barrier strips extending along the side rails above said channels to prevent penetration of the channels by roofing nails during covering of the flaring pieces by a roof covering;

a translucent panel slideably received in said channels; and

resilient gasket means extending along said channels and along said bottom rail for sealing the panel in the frame.

4,930,275
SKYLIGHT ASSEMBLY
Stanley M. Verby, 218 Albon Rd., Hewett Harbor, N.Y. 11557, and Barry Mirsky, 159 Wedgewood Dr., Haupaugue, N.Y. 11788
Filed May 17, 1988, Ser. No. 194,817
Int. Cl.[5] E04B 7/18
U.S. Cl. 52—200 15 Claims



1. A skylight assembly for an opening through a surface of a roof of a building, said opening having a periphery which is substantially coplanar with said roof surface and does not include a raised curb, said assembly comprising:

glazing means having a geometric shape and size suitable for substantially covering said opening while allowing light to enter;

a frame surrounding the periphery of said glazing means and having a depending skirt portion;

a frame curb assembly shaped in conformity with and adapted for insertion into said opening and attachment to said roof from the interior, said frame curb assembly comprising:

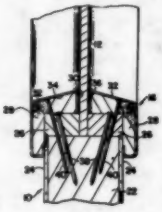
an upright wall portion adjacent an inner wall of said skirt portion, extending towards said glazing means and having inner and outer upright surfaces, said upright wall portion including a cavity between said inner and outer upright surfaces;

a flashing flange integrally formed with said outer upright surface extending outwardly from said outer surface and adapted to rest on said roof surface of said building adjacent said opening;

a mounting flange integrally formed with said upright wall portion, said mounting flange being defined by an inwardly directed recessed portion of said upright wall, said mounting flange including an outer wall and an inner wall with a cavity therebetween, said inner wall being substantially aligned with said inner upright surface and said outer wall lying in a substantially parallel plane between the inner upright surface and the outer upright surface, said mounting flange extending into the interior of said building, said mounting flange being adapted to function as a raised curb assembly along the periphery of said opening; and

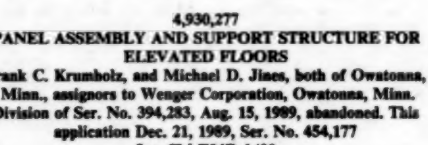
fastening webs with said cavity of said mounting flange for accepting fasteners inserted from the interior of said building through said inner wall of said mounting flange to fasten said assembly to said building, said fastening webs providing reinforcement to said frame curb.

4,930,276
FIRE DOOR WINDOW CONSTRUCTION
Harinder S. Bawa, La Habra, and Christopher P. Abbey, Cerritos, both of Calif., assignors to Dynamics Corporation of America, Greenwhich, Conn.
Filed Jul. 11, 1989, Ser. No. 378,594
Int. Cl.[5] E06B 3/58
U.S. Cl. 52—211 6 Claims



1. A fire door comprising a core of incombustible material with a wood veneer facing extending substantially throughout the area of each of the opposite surfaces thereof, said door having an opening therethrough with a pane of glass thereacross and with opposite flat surfaces of the pane of glass parallel to but spaced inwardly respectively from the exposed surfaces of said wood veneer facings, at least one elongated trim strip on either side of said pane of glass comprising elongated inner and outer members, the inner member being of a high density incombustible mineral material having a first elongated surface engaging the core of the door throughout the core's marginal edge around the pane of glass and a second surface engaging the pane of glass throughout a marginal edge portion thereof, and the outer member being coextensive with the inner member around the pane of glass and generally L-shaped in cross section so as to extend laterally from the pane of glass about the inner member and parallel with the surface of the door beyond the marginal edge of the opening in the door, the outer member being of a fire retardant particle board and having an exposed wood veneer facing throughout, and a plurality of nails extending through said members and into the core of the door whereby to secure the trim strip to the door and thus to secure the pane of glass in the door opening.

4,930,277
PANEL ASSEMBLY AND SUPPORT STRUCTURE FOR ELEVATED FLOORS
Frank C. Krumbolz, and Michael D. Jines, both of Owatonna, Minn., assignors to Wenger Corporation, Owatonna, Minn.
Division of Ser. No. 394,283, Aug. 15, 1989, abandoned. This application Dec. 21, 1989, Ser. No. 454,177
Int. Cl.[5] E04B 1/00
U.S. Cl. 52—263 8 Claims



1. A multileveled, stepped riser assembly comprising:

a plurality of generally horizontal step panels, each panel having a front and rear edge;

a plurality of support legs for supporting said step panels at various levels; and

a generally vertical riser beam having an upper and lower

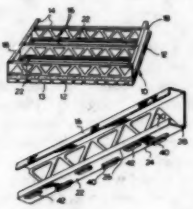
margin, an upper interlocking means for detachable coupling of said riser beam upper margin to the front edge of a first, upper step panel, a lower interlocking means for detachable coupling of said riser beam lower margin to a second, lower step panel, and support leg interlocking means for detachable coupling of said riser beam to said support legs.

4,930,278

COMPOSITE CEMENTITIOUS BUILDING PANELS

Stjepan Staresina, Burlington, and John A. Rowe, Whitby, both of Canada, assignors to In-Ve-Nit International Inc., Ajax, Canada

Filed Jun. 2, 1988, Ser. No. 201,227
Int. Cl.[5] E04C 2/38
U.S. Cl. 52—315 15 Claims



1. A building panel comprising:

a thin slab of cementitious material having a generally planar inner surface;

a plurality of transversely spaced apart axially elongated studs, each said stud including a flange portion and a web portion upstanding from said flange portion; and

a plurality of finger like tabs connected directly to said flange portion at axially spaced apart intervals therealong to downwardly depend therefrom,

said tabs each comprising a minor root portion contained in a plane generally at right angles to the plane of said flange portion, and a major end portion contained in a plane generally parallel to the plane of said flange portion,

said flange portion locating substantially in the planar inner surface of said slab with said tabs being embedded in said slab to lock said studs thereto.

4,930,279

MEANS FOR FILLING, SEALING AND CONCEALING AN ELONGATED GROOVE

Joseph Bart, St. Charles, and Burnell J. Wollar, Barrington, both of Ill., assignors to Phillips Plastics Corporation, Prescott, Wis.

Filed Nov. 28, 1988, Ser. No. 276,574
Int. Cl.[5] E04C 1/34
U.S. Cl. 52—466 14 Claims

1. Means for filling, sealing and concealing a groove of fixed and constant dimensions formed in the surface of a structure comprising:

an elastic first member for disposition in said groove and having a slot extending inwardly from a side thereof and having expandable walls bounding said slot;

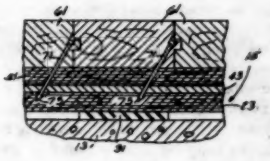
and a rigid second member comprising an upper trim portion and a lower portion insertable in said slot to effect expansion of said walls so that said first member substantially fills and seals said groove and is frictionally secured therein, and so that said upper trim portion overlies said surface of said structure and conceals said groove, said first member therein and said lower portion of said second member, said lower portion of said second member having means thereon which frictionally engage the inner surfaces of said walls of said elastic first member so as to releasably secure said second member to said first member, said means on said second member comprising serrations on said lower portion which frictionally engage and dig into said inner surface.

4,930,280

FLOORING SYSTEM WITH METAL STRIPS

Thomas W. Abendroth, Mercer, Wis., assignor to Abendroth Corullo Stephenson, Inc., Mercer, Wis.

Filed Sep. 22, 1989, Ser. No. 410,853
Int. Cl.[5] E04B 1/62
U.S. Cl. 52—403 22 Claims



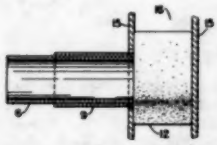
1. A flooring system adapted to be laid on a rigid supporting slab, said system comprising an understructure resting on the supporting slab, and a floating floor assembly comprising a series of parallel and spaced apart steel strips resting on said understructure, a layer of plywood on said steel strips, a series of floor boards in abutting parallel relation to each other, extending transversely to said steel strips, and located on said plywood layer, and a plurality of fasteners extending through said floor boards, through said plywood layer, and through said steel strips.

4,930,281

WALL REPAIR DEVICE AND METHOD OF USE

Danny T. Martin, and Jim G. Schreiner, both of Sacramento, Calif., assignors to J & M Home Products, Inc., Sacramento, Calif.

Filed May 11, 1989, Ser. No. 350,515
Int. Cl.[5] E02D 37/00; E04G 23/00
U.S. Cl. 52—514 13 Claims



1. A device for repairing a hole in a wall surface, comprising:

(a) a plunger;

(b) a barrel with an inner diameter shaped to receive said plunger; and

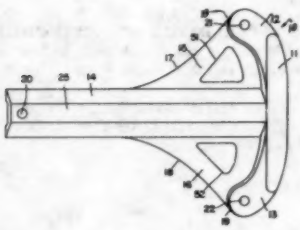
(c) a support member compressibly fitted within said barrel,

wherein when said plunger is inserted within said barrel, fitted within said hole in said wall surface, said support member is delivered in an expanded form into a wall space behind said wall surface.

4,930,282
ARCHITECTURAL TILE
David F. Meadows, Rte. 3, Box 51, Milton, W. Va. 22541
Filed Jan. 26, 1988, Ser. No. 148,608
Int. Cl.[5] E04D 1/34
U.S. Cl. 52—551 16 Claims

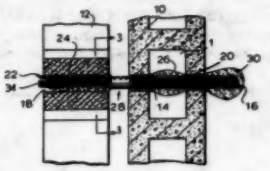
1. An architectural tile comprising a body, first securing means extending in a longitudinal direction along opposite sides of said body for being received in a clamping means of a facing file for securing adjacent tiles together, clamping means on said body intermediate said first securing means, wherein said first securing means and said clamping means comprise means for receiving an end of an adjacent, overlapped body in said longitudinal direction allowing said body to overlap said adjacent, overlapped body, and ridge means extending from the bottom surface of said body for engaging an upper surface of said adjacent overlapped body for spacing said body from said overlapped body for creating a shadow line.

4,930,283
BRICK
Bernhard Winkler, Starnberg, Fed. Rep. of Germany, assignor to Steiner Silidur AG Andelfingen, Andelfingen, Switzerland
Filed May 19, 1989, Ser. No. 354,541
Claims priority, application Switzerland, May 19, 1988, 1899/88
Int. Cl.[5] E04B 5/04
U.S. Cl. 52—611 10 Claims



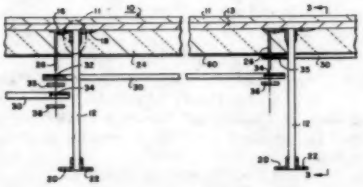
1. A brick consisting of cement or synthetic sand or gravel for use in combination with other like bricks for erecting dry construction, earth retaining walls, each said brick comprising: a straight tie bar attached as a single, unitary element at the center of a shield-type support having a convex face and at right angles to at least a center section of said shield-type support; side wing sections formed at sides of said shield-type support and having a height so as to be below the shield-type support; and attachment means formed in said tie bar for cooperating with said attachment means formed in said other like bricks.

4,930,284
MASONRY ANCHOR
Gene A. Falco, 34 Windemere Way, Woodbury, N.Y. 11797
Continuation of Ser. No. 135,662, Dec. 21, 1987, abandoned, which is a continuation of Ser. No. 34,591, Mar. 30, 1987, abandoned. This application Apr. 19, 1989, Ser. No. 341,276
Int. Cl.[5] E04B 1/48
U.S. Cl. 52—704 3 Claims



1. Apparatus for forming, in combination with a hardenable thixotropic adhesive mass, a fastening between spaced masonry elements having random voids and fissures, said apparatus comprising an axially elongated cylindrically shaped porous sleeve filled with the hardenable mass, having a leading end and a trailing end, said sleeve being closed at the leading end of said sleeve and open at the trailing end of said sleeve, said sleeve being provided with at least two axial sections each having a different mesh size so as to selectively regulate the amount of hardenable adhesive passing through said screen along the length thereof, and ram means insertable within the trailing end of said sleeve comprising a conically tapered pin to extrude a minimal amount more than the volume of said pin of hardenable mass from said sleeve.

4,930,285
SYSTEM AND METHOD OF INSTALLING ROOF INSULATION
Lonnie R. Ward, Flower Mound, Tex., assignor to Spectrum Contracting, Inc., Lewisville, Tex.
Continuation-in-part of Ser. No. 119,665, Nov. 12, 1987, abandoned. This application Jan. 9, 1989, Ser. No. 295,109
Int. Cl.[5] E04B 1/62
U.S. Cl. 52—743 16 Claims



1. A method of installing thermal insulation beneath a structural steel supported roof structure comprising the sequential steps of:

securing elongated fastener elements spaced apart in a predetermined alignment and in a depending substantially vertical orientation to a horizontal surface in the under area of the roof;

placing thermal insulation of predetermined thermal rating extending past said fastener elements and in position underlying the roof generally parallel to and intervening the structural steel roof supports;

mounting relatively rigid elongated and narrow insulation support members end-to-end in tandem onto said fastener elements in underlying support relation to the placed thermal insulation thereat; and

securing said insulation support members in said underlying relation by placing a cooperative interlock member over

the distal end of each of said fastener elements from a location beneath said support members.

4,930,286

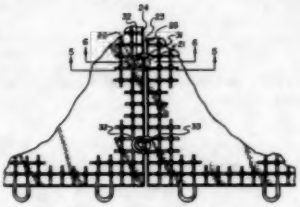
MODULAR SPORTS TILE WITH LATERAL ABSORPTION

Daniel Kotler, 6233 Canyon Cove Cir., Salt Lake City, Utah 84121

Continuation-in-part of Ser. No. 167,708, Mar. 14, 1988, Pat. No. 4,860,510. This application Feb. 6, 1989, Ser. No. 307,272

Int. Cl.[5] E01C *5/20*; E04F *15/02*

U.S. Cl. 52—177 7 Claims



1. An array of interlocked modular tiles forming a floor covering which provides enhanced traction at its playing surface and improved tolerance to sudden lateral movement, each of said interlocked tiles comprising:

a plastic support grid having a rectangular configuration bounded by a perimeter wall on four sides and including a repeating pattern of intersecting cross members of common corresponding dimensions integrally formed and extending inward from the perimeter wall and joined at cross junctions along a common plane with interstitial openings formed therebetween;

a plurality of support legs of common length integrally coupled to a base side of the cross junctions in general perpendicular orientation with respect to the support grid;

interlock means coupled to and extending outward from the perimeter wall to enable removable attachment of additional modular tiles of similar design at corresponding edges thereof;

said interlock means being coupled to interlock means of each adjacent tile in the array and providing a continuous, uniform displacement gap between adjacent perimeter walls, said gap providing a static separation distance within the range of 0.5 to 2.0 mm, said separation distance being established by a biased position on the interlocking means which yields in response to lateral forces imposed at the tile along a perpendicular orientation with respect to the attached perimeter wall to collapse or extend the gap and thereby absorb the lateral forces, said interlock means providing a restoration force to return to the biased position and desired gap range; and

a continuous sheet of plastic integrally formed in uniform thickness with a top edge of the support grid to provide a flat surface cap bounded at its edges by the perimeter walls of the tile.

4,930,287

DISTORTION-FREE VINYL SIDING

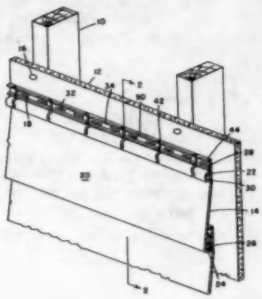
Joseph Volk, North Tonawanda, and Salvatore R. Taravella, Buffalo, both of N.Y., assignors to National Gypsum Company, Dallas, Tex.

Division of Ser. No. 263,855, May 14, 1981. This application May 29, 1986, Ser. No. 868,245

Int. Cl.[5] B28B *11/12*

U.S. Cl. 52—748 4 Claims

1. The method of making elongate, thin integral sections of lap siding comprising the steps of forming an elongate thin section of material formed to be applied in overlapping relation on a building exterior and including an exposed elongate face portion along one side and an elongate concealed portion along the opposite side formed to be overlapped by an adjacent section of lap siding, all portions of said concealed portion being originally formed in an unbroken, continuous elongate form and substantially all portions of said concealed portion subsequently being divided into a plurality of longitudinally



separated portions by the removal of material, said removal of material being at spaced locations along the concealed portion edge and extending inwardly from said edge substantially to the innermost extent of said concealed portion thus severing substantially all portions of said concealed portion, said concealed portion including elongate means for receiving an interlocking elongate bottom edge of an overlapping section of lap siding and said removal of material extending through said elongate receiving means.

4,930,288

DEVICE FOR SEALING FOIL COVERS ONTO CONTAINERS, PARTICULARLY PLASTIC CUPS

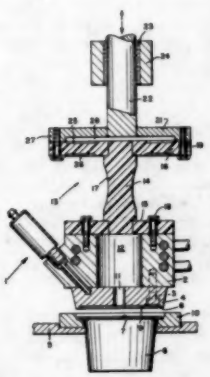
Harald Juenkersfeld, Wuppertal, Fed. Rep. of Germany, assignor to Benz & Hilgers GmbH, Duesseldorf, Fed. Rep. of Germany

Filed May 9, 1988, Ser. No. 191,648

Claims priority, application Fed. Rep. of Germany, May 8, 1987, 3715356

Int. Cl.[5] B65B *7/28*

U.S. Cl. 53—329 9 Claims



1. A device for sealing packaging containers, in particular

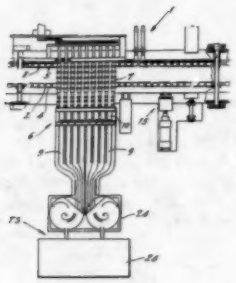
plastic cups, by means of a heatable sealing head, comprising a formatted part operatively mounted on said sealing head, a driving mechanism reciprocally slidably mounted in said device for moving said sealing head toward plastic cup, a compensation mechanism having at least one thermal insulating element having a heat resistance of at least 240° C. being operatively mounted in said device between said driving mechanism and said heatable sealing head and being operatively connected to both, said compensation mechanism and said insulating element are formed by an insulating body having opposite axial ends, one of said ends is connected to said sealing head and the other end is connected to said driving mechanism.

4,930,289

MACHINE FOR PACKING TABLETS INTO TUBES

Gosta Fransson, Kalmar, and Charles Gorder, Torsas, both of Sweden, assignors to Gordic Trading AB, Sweden

Filed Apr. 12, 1989, Ser. No. 336,708
Int. Cl.[5] B65B *35/30, 35/56, 39/00*
U.S. Cl. 53—251 **10 Claims**



1. A machine for packing tablets into tubes, said machine comprising a filling station, a conveyor with pushers to feed tubes intermittently to the filling station and, after filling, to carry the filled tubes away from the station, wherein the filling station includes at least three parallel, rotating rollers arranged to be brought into contact with and rotate at least two tubes closed at one end, the rotating rollers having a specified inclination to the horizontal plane so that the open end of the tube is at a higher level than the closed end, a plurality of transfer means for transferring tablets from a tablet source to the empty tubes, and one supply magazine connected to each transfer means, to raise the tablets to an upright position and transfer them from transfer means to tube.

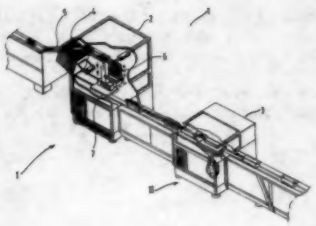
4,930,290

CARTON PACKAGING SYSTEMS AND PROCESSES

Michael J. Barker, Tring, United Kingdom, assignor to Omnitech (Europe) Limited, Bucks, England

Filed Nov. 28, 1988, Ser. No. 276,857
Claims priority, application United Kingdom, Nov. 30, 1987, 8727938
Int. Cl.[5] B65B *11/18*
U.S. Cl. 53—456 **24 Claims**

1. A modular carton-packaging apparatus comprising a modular carton-forming means, a modular product-loading means, and means to synchronize the carton forming and product loading such that each carton is formed and loaded before each sucessive carton is formed and loaded, the modular product-loading means comprising chute means to load product onto a portion of a carton blank, the chute means including a first leg for receiving a product in one plane and a second leg



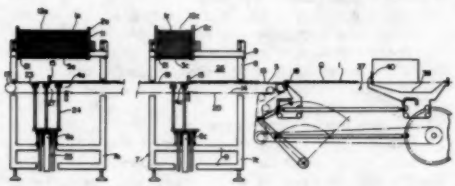
for directing the product onto another plane in which the carton blank is disposed.

4,930,291

PROCESS FOR THE HORIZONTAL UNIT DISTRIBUTION OF BLANKS

Jean-Louis Baisseau, Sainte Savine, France, assignor to Vega Automation, La Chapelle Saint Luc, France

Filed Feb. 18, 1988, Ser. No. 157,244
Claims priority, application France, Feb. 18, 1987, 87 02097
Int. Cl.[5] B65B *43/46*
U.S. Cl. 53—458 **13 Claims**



1. A process for packaging contents in containers comprising boxes, cases, or crates produced from blanks, the blanks being stored horizontally in groups in a plurality of vertical stacks in a corresponding plurality of magazines, the magazines being placed next to one another and having lower extraction orifices from which the lowest blank in the stack is discharged, each magazine having a corresponding transfer means structurally and functionally associated therewith, the transfer means being movable up and down, and the magazines being maintained in an overall, fixed position above a conveyor means between two successive, different selections, the conveyor means moving continuously in one direction, said process comprising the steps of:

(a) filling the plurality of magazines with the blanks;

(b) following step (a), selecting from the plurality of magazines an operational magazine from which a blank is to be extracted and selecting only the transfer means associated with the operational magazine;

(c) following step (b), actuating only the selected transfer means, and using the selected transfer means, extracting the lowest blank from the lower extraction orifice of the operational magazine and moving the extracted blank downwardly to the conveyor means for its subsequent distribution;

(d) following step (c), moving the extracted blank continuously in one direction using the conveyor means, to distribute the extracted blank;

(e) following step (d), forming a container from the distributed blank; and

(f) following step (e), placing the contents in the container, whereby continuous packaging of the contents in contain-

ers is effected without standstill times attributable to filling the magazines with blanks.

4,930,292

APPARATUS FOR WRAPPING ARTICLES WITH A FILM WEB

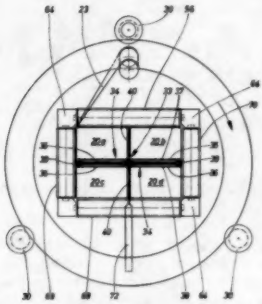
Heinz Focke, and Kurt Liedtke, both of Verden, Fed. Rep. of Germany, assignors to Focke & Co. GmbH & Co. Verden, Fed. Rep. of Germany

Filed Aug. 15, 1988, Ser. No. 232,201

Claims priority, application Fed. Rep. of Germany, Aug. 14, 1987, 3727076

Int. Cl.[5] B65B *13/04*

U.S. Cl. 53—588 17 Claims



1. An apparatus for encasing articles in a wrapping from a film web which, during the advance of the articles, is passed around the articles with overlapping of the web's edges, said apparatus comprising:

a winding unit for wrapping the film web around the articles;

an inward conveyor (31) for feeding the articles, as article groups (21) comprising two or more articles (20) arranged adjacent to one another, to said winding unit; said winding unit having a stationary support member (33) for the articles; and

an outward conveyor (32) for transporting the wrapped article groups with continuous wrapping;

wherein said outward conveyor is located downstream of the winding unit, and wherein said support member (33) supports the articles of an article group (21) between mutually facing article surfaces in the region of the winding unit.

4,930,293

AUTOMATIC BANDING MACHINE

John F. Hanscom, Rehoboth, Mass., assignor to H. F. Hanscom & Co., Inc., Providence, R.I.

Filed Feb. 13, 1989, Ser. No. 309,117

Int. Cl.[5] B65B *13/14*

U.S. Cl. 53—590 2 Claims

1. A bander for wrapping an article comprising

(a) a stationary platform for supporting an article to be banded;

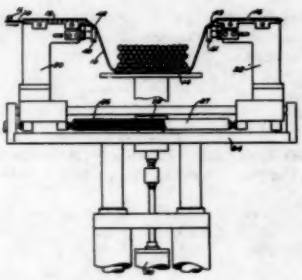
(b) a pair of article gripping jaws at opposed edges of the platform, said gripping jaws pivoted adjacent the ends of the platform and normally lying below the level of the platform;

(c) means feeding a length of cohesive/adhesive coated tape adhesive side up across the platform to lie thereon;

(d) a pair of guide means mounted at opposed edges of the platform and coupled together for movement in unison perpendicular to the plane of the platform through which guide means the tape passes and into which the tape is initially retained said guide means engaging at least the edges of the tape;

(e) presser blocks mounted on and below the guide means for movement therewith and parallel to the plane of the platform;

(f) means pivoting said gripping jaws in response to an article being placed on the tape and platform;



(g) means moving the said guide means and presser blocks in a direction substantially normal to said platform whereby the tape held in the guide means is drawn thereout and about the article and said presser blocks press the ends of the tape together at the top end of the upward movement of the guide means.

4,930,294

APPARATUS FOR CONTINUOUSLY CLEANING SOLVENT FROM WASTE AIR

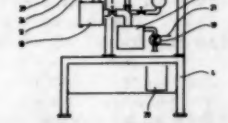
Rene Meier, Reckenbuhlstrasse 21, 6005 Luzern, Switzerland

Filed Aug. 29, 1989, Ser. No. 400,126

Claims priority, application Switzerland, Aug. 31, 1988, 03250/88

Int. Cl.[5] B01D *53/04*

U.S. Cl. 55—180 13 Claims



1. An apparatus for the continuous cleaning of solvent containing waste air with a regenerable receiving medium, for the exhausting of substantially pure air into the atmosphere, for the regeneration of the receiving medium and for the recuperation of the solvent, the apparatus having two receiving towers each containing an evaporator housing for the receiving medium and at least one microwave generator, a vacuum pump and a condenser, comprising:

an evaporator container formed of material neutral to microwaves enclosed by and spaced from all walls of an evaporator housing of a receiving tower, said evaporator con-

tainer containing a receiving medium for the preferred reception of substances of low polarity;

a pressure equalizing device connected between an interior of said evaporator housing and an interior of said evaporator container;

an intake stack adapted to be connected at one end to a source of solvent containing waste air and connected at an opposite end to said interior of said evaporator container; and

an exhaust connector open at one end to the atmosphere and connected at an opposite end to said interior of said evaporator container.

4,930,295

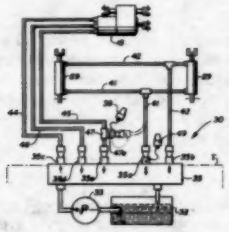
HYDRAULIC CYLINDER MODE SHIFT

Joseph C. Hurlburt, Lancaster, Pa., assignor to Ford New Holland, Inc., New Holland, Pa.

Filed Jul. 10, 1989, Ser. No. 377,662

Int. Cl.[5] A01D *69/03*

U.S. Cl. 56—10.9 **7 Claims**



1. In a crop harvesting machine mountable on a prime mover having a hydraulic system capable of supplying a source of hydraulic fluid under pressure for operation and movement of said machine over a field to harvest crop material, said crop harvesting machine having an articulated frame; hydraulic cylinder means cooperable with said articulated frame to effect movement thereof for alignment of said frame with said prime mover to facilitate mounting of said crop harvesting machine on said prime mover and to cause a generally vertical movement of at least a portion of said crop harvesting machine once mounted on said prime mover; rotatably driven harvesting components supported on said frame to effect a harvesting of crop material from the field; and a hydraulically powered motor operably connected to said harvesting components to provide rotational power thereto, said motor being connected to said hydraulic system by a pressure line and by a return line for the flow of hydraulic fluid from said hydraulic system to said motor and return thereto, the improvement comprising:

said hydraulic cylinder means having first and second hoses interconnecting said hydraulic cylinder means and said hydraulic system to provide hydraulic fluid under pressure thereto such that said hydraulic cylinder means powers the articulated movement of said frame in both first and second opposing directions; and

said return line including a connector having an externally directed port therein to couple said first hose thereto in flow communication with said return line upon disconnection of said first hose from said hydraulic cylinder means following a mounting of said crop harvesting machine on said prime mover, thereby permitting a powering of the movement of said hydraulic cylinder means in only one direction due to the supply of hydraulic fluid under pressure from said hydraulic system to said hydraulic cylinder means only through said second hose.

4,930,296

FRONT MOWER

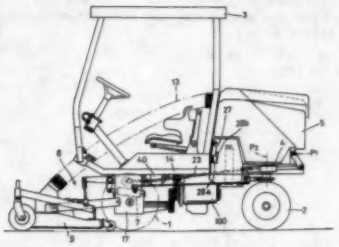
Terutaka Takei; Shigeru Morita; Yoshikazu Togoshi, and Yoshihiro Kawahara, all of Osaka, Japan, assignors to Kubota Ltd., Osaka, Japan

Filed Sep. 11, 1989, Ser. No. 405,795

Claims priority, application Japan, Jan. 31, 1989, 1-11093[U]

Int. Cl.[5] A01D *69/00*

U.S. Cl. 56—11.3 **8 Claims**



1. A vehicle having a working implement connected to the front of a vehicle body, comprising;

an engine,

a stepless change speed device disposed forwardly of said engine with respect to a fore and aft direction of the vehicle body for receiving drive from said engine,

an auxiliary change speed device disposed forwardly of said stepless change speed device for changing speed of the drive output from said stepless change speed device, and

a propelling drive transmission for receiving an output of said auxiliary change speed device, said propelling drive transmission including a front differential disposed in a region below said auxiliary change speed device.

4,930,297

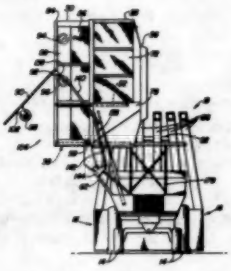
TELESCOPING BASKET FOR A COTTON HARVESTER

Francis E. Schlueter, Des Moines, and Kenneth C. McConnell, Ankeny, both of Iowa, assignors to Deere & Company, Moline, Ill.

Filed Oct. 11, 1988, Ser. No. 255,937

Int. Cl.[5] A01D *85/00, 87/00, 90/00*

U.S. Cl. 56—16.6 **32 Claims**



1. In a cotton harvester having a main frame and harvesting structure for removing cotton from plants, cotton basket structure for receiving the removed cotton comprising: a lower basket portion movably mounted on the main frame, a first actuator for moving the basket relative to the frame between dump and harvesting positions, an upper basket portion telescopingly received by the lower basket portion, a second actuator for moving the upper basket portion relative to the

actuator for moving the upper basket portion relative to the lower basket portion between an extended field-working position and a retracted storage position, operator control means for actuating a selected one of the first and second actuators, wherein the first actuator comprises a hydraulically actuated lift motor and the second actuator comprises a hydraulically actuated telescoping motor, and the operator control means includes valve structure for actuating a selected one of the motors and preventing simultaneous operation of the other one of the motors.

4,930,298

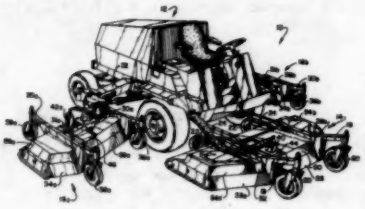
CUTTING UNIT COVER

Michael N. Zenner, Lakeville, Minn., assignor to The Toro Company, Minneapolis, Minn.

Filed Mar. 16, 1989, Ser. No. 324,120

Int. Cl.[5] A01D *67/00*

U.S. Cl. 56—17.4 **9 Claims**



1. A harvesting device cutting unit comprising:

(a) a cutting element;

(b) a frame for rotatably supporting the cutting element;

(c) a plastic cover for the cutting element frame;

(d) first means for securing the cover to the frame in a first direction comprising means for magnetically securing the cover to the frame; and

(e) second means for securing the cover to the frame in a second direction substantially perpendicular to the first direction, wherein the first direction is substantially vertical and the second direction is substantially horizontal, and wherein:

(i) the cover comprises first and second edges;

(ii) the magnetic securing means of the first securing means comprises a magnet connected to the frame and a magnetic element connected to the first edge of the cover, wherein when the cover is connected to the frame, the magnet acts upon the magnetic element to assist in downwardly drawing the first edge of the cover against the frame;

(iii) the first securing means further comprises first mechanical means for downwardly holding the second edge of the cover against the frame; and

(iv) the second securing means comprises second mechanical means for engaging the first edge of the cover and preventing horizontal movement of the cover relative to the frame.

4,930,299

MULTI-DIRECTIONAL SINGLE PIVOT FOR A COTTON HARVESTER DUCT

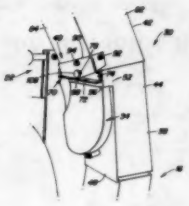
Steve H. McBee, Ankeny, Iowa, assignor to Deere & Company, Moline, Ill.

Filed Jun. 15, 1989, Ser. No. 367,400

Int. Cl.[5] A01D *46/10*

U.S. Cl. 56—30 **18 Claims**

1. In a cotton harvester having a row harvesting unit supported at the forward end of a main frame and moveable with respect to the frame, cotton conveying duct structure for directing cotton removed from the cotton rows by the units upwardly to a cotton receptacle, the duct structure including an upper duct portion and a lower portion connected for movement with the row unit, means for supporting the upper duct portion from the lower portion while providing free movement of the row unit relative to the upper duct portion,



the means for supporting including pivot structure having a single pivot location for facilitating relative movement between the upper duct portion and lower portion about at least two axes as the row unit is moved.

4,930,300

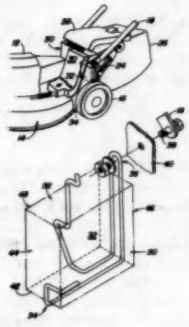
LAWN MOWER BATTERY MOUNTING

Dean W. Benter, Horicon, and James T. Dowe, Beaver Dam, both of Wis., assignors to Deere & Company, Moline, Ill.

Filed Jun. 2, 1989, Ser. No. 361,017

Int. Cl.[5] A01D *34/68, 67/00, 73/00*

U.S. Cl. 56—16.7 **10 Claims**



1. In a walk behind mower having a housing supported by ground engaging wheels, an engine carried on the housing and drivingly connected to a cutting blade, and means for electrically starting the engine, the improvement comprising:

a compartment formed in the housing;

a bracket carried in the compartment, said bracket including rod-like members;

a battery mountable in the bracket and being supported by the rod-like members on at least the bottom and one side thereof, said battery adapted to be connected to the means for electrically starting the engine.

4,930,301

DEVICE FOR CATCHING YARN UPON YARN BREAK IN TWO-FOR-ONE TWISTER

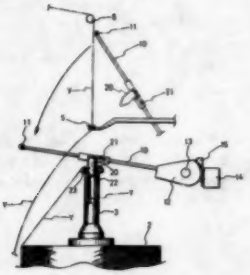
Tsukasa Kawarabashi, Kyoto, Japan, assignor to Murata Kikai Kabushiki Kaisha, Kyoto, Japan

Filed Nov. 28, 1988, Ser. No. 276,788

Claims priority, application Japan, Nov. 30, 1987, 62-182143[U]

Int. Cl.[5] D01H *7/86, 13/14*

U.S. Cl. 57—80 5 Claims



1. A device for catching yarn upon a break in the yarn in a two-for-one twister, comprising:

a tenser cap including an end portion having a substantially continuous peripheral surface defining the outer circumference of a hole in the tenser cap through which the yarn passes,

a drop wire operable for moving toward the tenser cap upon a break in the yarn, and

a contacting member secured to the drop wire and having a conically tapered lower end defining a substantially continuous peripheral surface, the peripheral surface of the contacting member being adapted for insertion into the hole of the tenser cap when the drop wire moves towards the tenser cap to contact substantially all of the peripheral surface of the end portion of the tenser cap when the drop wire moves toward the tenser cap,

whereby the yarn is positively caught between the contacting member and the end portion of the tenser cap when the drop wire moves toward the tenser cap.

4,930,302

BOBBIN TRANSPORTING SYSTEM

Yoshio Yamamoto, Kyoto, and Hiroshi Hiraoka, Takatsuki, both of Japan, assignors to Murata Kikai Kabushiki Kaisha, Kyoto, Japan

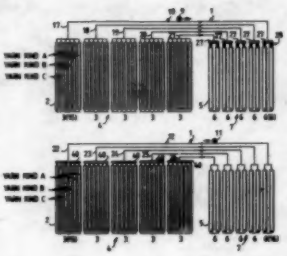
Filed Jan. 31, 1989, Ser. No. 304,494

Claims priority, application Japan, Feb. 1, 1988, 63-19497

Int. Cl.[5] B65H *67/06;* D01H *9/18*

U.S. Cl. 57—281 14 Claims

1. A bobbin transporting system, characterized in that a plurality of spinning frames are connected in parallel to each other to one end side of a single transport conveyor while a plurality of winders are connected to the other end side of said transport conveyor, that a spinning bobbin transporting path for transporting spinning bobbins produced on said spinning frames to said winders is formed on either one of an upper side and a lower side of said conveyor while an empty bobbin transporting path for transporting empty bobbins discharged from said winders to said spinning frames is formed on the other of the upper side and the lower side of said conveyor, and that said spinning bobbin transporting path and spinning bobbin taking-in sides of said winders are connected to each other by a first annular circulating path while said empty bobbin transporting path and empty bobbin taking-in sides of



said spinning frames are connected to each other by a second annular circulating path.

4,930,303

SPINNING APPARATUS

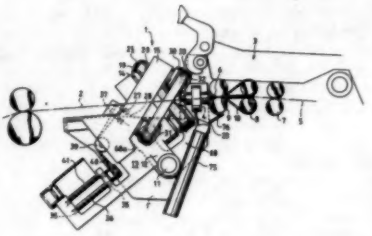
Hideshi Mori, Joyo; Hisaki Kato; Mitsuhiko Miyaoka, both of Shiga, and Hiroshi Yamaguchi, Kyoto, all of Japan, assignors to Murata Kikai Kabushiki Kaisha, Kyoto, Japan

Filed May 31, 1988, Ser. No. 201,041

Claims priority, application Japan, Jun. 2, 1987, 62-85849[U]; Jan. 27, 1988, 63-16146

Int. Cl.[5] D01H *5/28;* D02G *1/04*

U.S. Cl. 57—328 19 Claims



1. A spinning apparatus comprising a drafting device, an air jet nozzle and a false twisting unit including a pair of endless belts lying in surface contact with each other at a yarn nip point, said device, nozzle and unit being located in a path of yarn travel in the order named, said apparatus further comprising a support structure movably supporting said air jet nozzle and said false twisting unit for movement of both said air jet nozzle and said false twisting unit away from said path and for movement of said air jet nozzle and said false twisting unit toward and away from each other.

4,930,304

BRACELET WITH LINKS

Leonhard Meister, Selzach, Switzerland, assignor to Montres Rado S.A., Lengnau, Switzerland

Filed Jun. 23, 1989, Ser. No. 370,721

Claims priority, application France, Jun. 24, 1988, 88 08630

Int. Cl.[5] F16G *13/08*

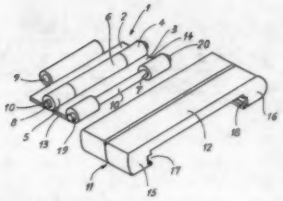
U.S. Cl. 59—80 8 Claims

1. A bracelet comprising:

an inner chain comprising a plurality of articulated links, each of said links having projections along transversal edges

with each of said projections having a hole extending therethrough;

a plurality of pins, each having first and second ends, each of said pins extending through the holes of two of said projections to thereby pivotally connect each link to at least one other link; and,



a plurality of decorative elements arranged side by side and at least partially surrounding said inner chain,

each of said decorative elements having first and second pin receiving portions for receiving said first and second ends of one of said pins,

whereby said pins pivotally connect said links and also retain said decorative elements on said inner chain.

4,930,305

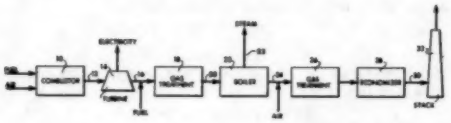
LOW NOX COGENERATION PROCESS

Ronald D. Bell, Austin, Tex., assignor to Radian Corporation, Austin, Tex.

Continuation-in-part of Ser. No. 122,067, Nov. 18, 1987, Pat. No. 4,811,555. This application Oct. 3, 1988, Ser. No. 252,690

Int. Cl.[5] F02C *7/00*

U.S. Cl. 60—39.06 **14 Claims**



1. A process for low NOX cogeneration to produce electricity and heat which comprises combusting fuel to produce a gaseous stream of combustion products, passing said gaseous stream through a turbine to generate electricity, and to produce a gaseous exhaust stream, adding additional fuel to said exhaust stream, to provide a fuel-rich gas stream having fuel in excess of the oxygen in said gas stream, catalytically treating said gas stream with a reducing catalyst in a reducing atmosphere to produce a treated gaseous stream, converting at least a portion of the heat in said treated stream into steam, adding air to said treated stream to produce a stoichiometric excess of oxygen in the resultant stream relative to fuel present in said resultant stream, passing said resultant stream over an oxidizing catalyst to produce an oxidized gaseous stream, removing heat from said oxidized stream, and venting the resultant cooled stream.

4,930,306

REDUCING CARBON BUILDUP IN A TURBINE ENGINE

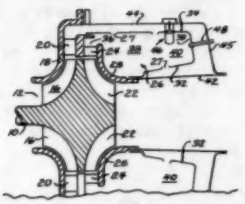
Jack R. Shekleton, San Diego, Calif., assignor to Sundstrand Corporation, Rockford, Ill.

Filed May 26, 1988, Ser. No. 199,246

Int. Cl.[5] F23R *3/54*

U.S. Cl. 60—39.36 **4 Claims**

1. In a turbine engine including a compressor coupled to a turbine wheel and mounted for rotation about an axis, a nozzle disposed to direct gas at said turbine wheel to drive the same; an annular combustor disposed about said axis in fluid communication with said nozzle and having a radially inner wall, a radially outer wall and a generally radially extending wall interconnecting said inner and outer walls at a location opposite said nozzle, a plurality of fuel injectors for injecting carbonaceous fuel generally axially between said inner and outer walls near said radial wall, a compressed air plenum in fluid communication with said compressor and surrounding said walls of said combustor in generally spaced relation, a plurality of circumferentially spaced apertures in said radial wall to



provide for the flow of cooling air from said plenum to the interior of the combustor, and a cooling strip within said combustor for directing air passing through said apertures along said radial wall, the improvement for substantially reducing carbon buildup within said combustor wherein said apertures are located closely adjacent the radially outer part of said radial wall and said cooling strip is located to direct air passing through said apertures radially inwardly along said radial wall; the radially inner part of said radial wall being free of said apertures and said cooling strips.

4,930,307

DUCTED FAN GAS TURBINE ENGINE WITH SURGE CONTROLLER

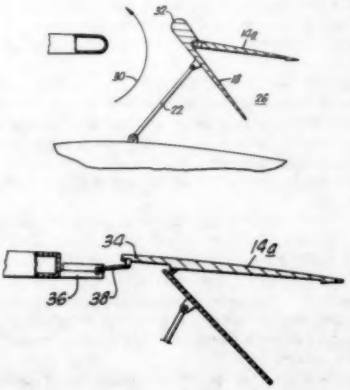
Arnold C. Newton, Ockbrook, England, assignor to Rolls-Royce plc, London, England

Filed Dec. 1, 1988, Ser. No. 278,445

Claims priority, application United Kingdom, Dec. 2, 1987, 8728194

Int. Cl.[5] F02K *1/64*

U.S. Cl. 60—226.1 **3 Claims**



1. A ducted fan gas turbine engine including a fan surge controller comprising a cowl which surrounds a fan stage of the ducted fan gas turbine engine and includes an upstream

portion fixedly supported in coaxial relationship with a core gas generator of the ducted fan gas turbine engine, a downstream portion supported from and adapted for axial movement relative to the upstream portion so as to create and close a gap therebetween, a plurality of blocker flaps pivotally fastened to and underlapping the downstream cowl portion and shaped so as to define a substantial portion of the leading edge thereof, and wherein the trailing edge of those portions of the fixed cowl portion which oppose the blocker flaps are convex in form and are deformable on engagement with the leading edges of the blocker flaps so as to effect a seal against egress of fan air, means for moving the downstream cowl portion and means for effecting pivoting of the blocker flaps across the fan duct, said means for moving the downstream cowl portion being operable to initially move the downstream cowl portion and associated blocker flaps to open a first gap while the blocker flaps are maintained in their non-blocking position, gap blocking means being provided in interspersed positional relationship with said blocker flaps.

4,930,308

DOUBLE-FLOW TURBOSHAFT ENGINE WITH VARIABLE CONFLUENT NOZZLE

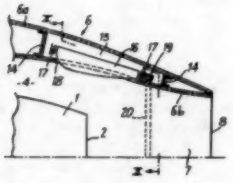
Etienne Fage, Jouy en Josas, France, assignor to The Dee Howard Co., San Antonio, Tex.

Continuation of Ser. No. 77,301, Jul. 24, 1987, abandoned. This application Apr. 18, 1989, Ser. No. 339,874

Claims priority, application France, Aug. 11, 1986, 86 11590

Int. Cl.[5] F02K *3/02*

U.S. Cl. 60—262 **9 Claims**



1. A confluent nozzle type double-flow turboshaft engine capable of providing increased output thrust without exceeding operating temperature limitations to compensate for performance degradation of the engine when it is operating in a high ambient temperature environment, comprising:

a central generator emitting at its outlet orifice a hot gas flow;

an annular bypass duct surrounding said central generator and extending beyond said outlet orifice of said central generator to form a nozzle past the outlet orifice of said central generator to provide thereby a bypass cold gas flow passing through said bypass duct which is confluent with the hot gas flow of said central generator within said nozzle;

selectively operable means in said bypass duct substantially at the plane of said outlet orifice of said central generator for partially and in a substantially circumferential manner obstructing said bypass duct about its outer circumference, and at a substantially coplanar relationship with the outlet orifice of the central generator to reduce the annular area through which said cold gas flow passes out of said nozzle;

whereby the ratio of the cross-sectional axis of the circular area through which said hot gas flow is emitted out of said nozzle relative to the annular area through which said cold gas flow passes is increased to permit an increase in the output thrust of said engine without exceeding its operational temperature limitation.

4,930,309

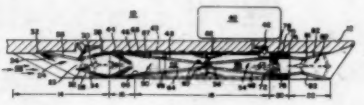
GAS COMPRESSOR FOR JET ENGINE

Neil W. Hartman, Tucson, Ariz., assignor to Fleck Aerospace Limited Partnership, Brookfield, Wis.

Filed Nov. 3, 1988, Ser. No. 267,994

Int. Cl.[5] F02K *7/08*

U.S. Cl. 60—267 **18 Claims**



1. A gas compressor including a housing defining a passage therethrough, said housing having an inlet and an outlet, both configurable in a generally converging-diverging shape, means to vary the configuration of said inlet, means to vary the configuration of said outlet, a mixing chamber in said housing located downstream of and in fluid communication with said inlet adapted to receive a flow of gas from said inlet, a source of liquid coolant, first liquid coolant injection means associated with said liquid coolant source and said mixing chamber adapted to inject said liquid coolant into said mixing chamber with an axial velocity component in the direction of said outlet to accomplish modification of stagnation enthalpy, pressure and temperature of gases in said mixing chamber, a diffuser in said housing disposed downstream of and in fluid communication with said mixing chamber, said diffuser including a supersonic diffuser section defining a chamber of decreasing cross-sectional area, a subsonic diffuser section defining a chamber of increasing cross-sectional area and a throat connecting said supersonic diffuser section and said subsonic diffuser section and low pressure inducing means located downstream of said mixing chamber for inducing a region of sufficiently low pressure within said mixing chamber to cause a supersonic flow of gas from said inlet through said mixing chamber.

4,930,310

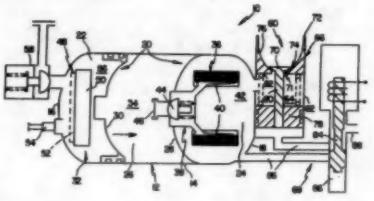
MONOPROPELLANT PLENUM PROPULSION SYSTEM WITH INTEGRATED VALVE/NOZZLE FOR FAST RESPONSE THRUST

Frank X. McKevitt, Bellevue, Wash., assignor to Rockcor, Inc., Redmond, Wash.

Division of Ser. No. 147,072, Jan. 20, 1988, Pat. No. 4,805,399, which is a continuation of Ser. No. 811,569, Dec. 18, 1985, abandoned. This application Nov. 25, 1988, Ser. No. 275,883

Int. Cl.[5] F02K *1/08*

U.S. Cl. 60—271 **4 Claims**



1. In a rocket engine capable of repetitive firings through a nozzle having a throat and an expansion region, the improvement comprising:

(a) reusable nozzle plug means for closing the throat of the nozzle until actuation of the engine, said plug means forming part of said throat of said nozzle upon actuation of said engine;

(b) actuator means for repetitively moving the plug means

from a first position closing the nozzle to a second position opening the nozzle in response to repetitive actuation of the engine; and

(c) return means for repetitively moving the plug from the second position back to the first position in response to repetitive deactuation of the engine, said nozzle plug means comprising a valve member having a portion passing through said throat connecting to said actuator means.

4,930,311

EXHAUST AND INLET LINE BRAKE VALVES FOR HYDROSTATIC MOTOR

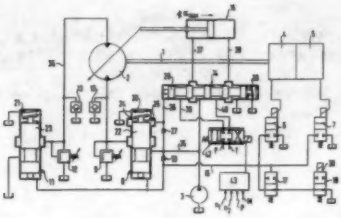
Jörg Dantlgraber, Sackenbach, Fed. Rep. of Germany, assignor to Mannesmann Rexroth GmbH, Lohr/Main, Fed. Rep. of Germany

Filed Aug. 22, 1988, Ser. No. 235,009

Claims priority, application Fed. Rep. of Germany, Aug. 24, 1987, 3728206

Int. Cl.[5] F16H *39/44*; B60K *41/16*; F04B *1/08*

U.S. Cl. 60—406 **13 Claims**



1. Safety arrangement for a hydrostatic machine of variable absorption or displacement volume connected to a pressure network having a pressure source, adjustment means for the pivot angle of said machine, a regulating valve for selectively connected said adjustment means selectively to a fluid source and a tank, said regulating valve being operable by an electrical signal generated in a control means in response to a plurality of input quantities, characterized in that in the hydraulic connector between said hydrostatic machine and said pressure source a normally open shutoff valve is provided and means for closing said shutoff valve in response to an excessive speed condition of said hydrostatic machine.

4,930,312

BRAKE ACTUATOR FOR HYDRAULIC MOTORS

Jeffrey D. Metcalf, Albion, Ill., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Oct. 3, 1988, Ser. No. 252,587

Int. Cl.[5] F16D *31/00*

U.S. Cl. 60—442 **8 Claims**

1. A brake actuator in combination with a hydraulic motor, comprising:

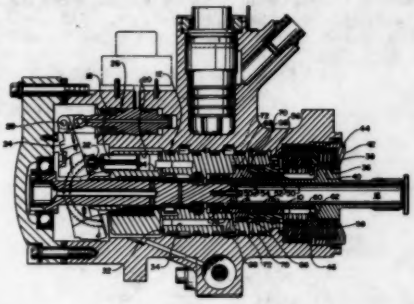
a port structure defining an interface with a motor block of the hydraulic motor and including portion means for supplying fluid to the motor;

brake means operatively associated with the hydraulic motor;

piston means for actuating the brake means, the piston means being located within the port structure;

cylinder means defined between the port structure and the piston means, the cylinder means including a first chamber on one side of the piston means and a second chamber on an opposite side of the piston means;

a first passage through the port structure to the first chamber; and



a second passage through the port structure to the second chamber.

4,930,313

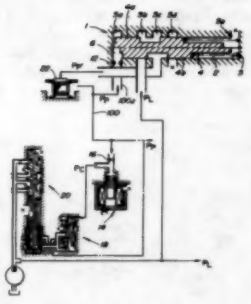
AUTOMATIC TRANSMISSION PRESSURE-REGULATING VALVE WITH FILTERED FLOW TO OUTLET PRESSURE FEEDBACK CHAMBER

Koichi Hayasaki, Fujisawa, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Nov. 14, 1988, Ser. No. 270,909

Int. Cl.[5] B60K *41/16*; F15B *21/04*

U.S. Cl. 60—454 **3 Claims**



1. In a transmission

a source of hydraulic fluid under pressure;

a first valve, said first valve being in fluid communication with said source and so constructed and arranged as to modify the supply of hydraulic fluid under pressure to form an essentially constant level pressure, said first valve including a spool valve element which controls the fluid communication between a supply port in fluid communication with said source, and a discharge port;

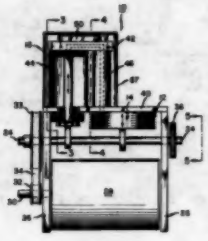
a filter, said filter being arranged to remove particles contained in the fluid discharged from said discharge port;

means defining a feedback chamber in said valve, said spool valve element having a portion exposed to said feedback chamber, said feedback chamber being fluidly communicated with said discharge port by way of said filter in a manner wherein the pressure which is supplied into said feedback chamber from said discharge port is subject to the flow restricting properties of said filter.

4,930,314
STIRLING CYCLE MACHINE

Sibley C. Burnett, Cardiff by the Sea; John R. Purcell; William P. Creedon, both of San Diego, all of Calif., and Chandrashekhar H. Joshi, Bedford, Mass., assignors to CDC Partners, San Diego, Calif.

Filed Sep. 8, 1989, Ser. No. 404,605
Int. Cl.[5] F02G 1/04
U.S. Cl. 60—517 9 Claims



1. In a Stirling cycle machine including first and second variable-volume, compression-expansion chambers containing a gas a regenerator interconnecting the chambers and for conducting the gas therebetween, and eccentric drive means for driving the first and second chambers

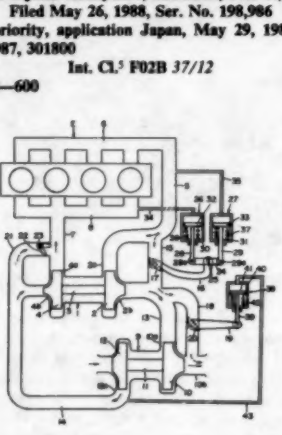
wherein the improvement comprises:

said eccentric drive means comprising a pair of rotatably mounted shafts, at least one pair of eccentric disks fixed on said shafts in phase with each other, and means for causing said shafts and thereby said eccentric disks to rotate in opposite directions.

4,930,315
TURBO-CHARGER ENGINE SYSTEM

Hiroshi Kanesaka, Kawasaki, Japan, assignor to Usui Kokusai Sangyo Kabushiki Kaisha, Nagasawa and Kabushiki Kaisha Kanesaka Gijutsu Kenkyusho, Kawasaki, both of, Japan

Filed May 26, 1988, Ser. No. 198,986
Claims priority, application Japan, May 29, 1987, 134233; Nov. 30, 1987, 301800
Int. Cl.[5] F02B 37/12
U.S. Cl. 60—600 5 Claims

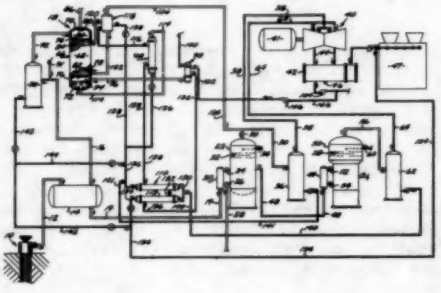


1. A turbo-charger engine system for an engine, said system comprising an exhaust pipe leading from the engine and a charging pipe leading to the engine, a plurality of turbo-chargers connected in series with the engine in a communication manner, said plurality of turbo-chargers comprising a high-pressure turbo-charger and at least one low pressure turbo-charger, said high-pressure turbo-charger being in communication with said exhaust pipe and said charging pipe, a low-pressure exhaust pipe providing communication from said high-pressure turbo-charger to said low pressure turbo-charger and a low-pressure charging pipe providing communication from said low-pressure turbo-charger to said high-pressure turbo-charger, an exhaust bypass providing communication directly between the exhaust pipe and the low-pressure turbo-charger and bypassing the high-pressure turbo-charger, a charging bypass providing communication from said low-pressure charging pipe to said charging pipe and bypassing the high-pressure turbo-charger, an exhaust switching valve provided in the exhaust bypass for selectively disabling at least one said turbo-charger in response to a selected engine operating condition, a check valve provided in the charging bypass and an actuator operative in accordance with the state of engine operation for opening the exhaust switching valve, the improvement comprising a rotary valve provided in an intake passageway intermediate the charging pipe and the engine, pressure measuring means in communication with the charging pipe for sensing charging pressure in the charging pipe, opening and closing timing adjustment means operatively connected to the pressure measuring means and to the rotary valve, wherein the rotary valve is closed in the course of an intake stroke via the opening and closing timing adjusting mechanism operative in accordance with the charging pressure.

4,930,316
GEOTHERMAL PLANT NONCONDENSABLE GAS REMOVAL AND HEAT RECOVERY SYSTEM AND METHOD

Enos A. Bonham, Jr., Baton Rouge, La., assignor to Magma Power Company, San Diego, Calif.

Filed Jul. 11, 1988, Ser. No. 217,162
Int. Cl.[5] F03G 7/00
U.S. Cl. 60—641.5 54 Claims



1. In a geothermal electric power generating plant of the type wherein a primary flow stream of hot geothermal brine from production well means is partially flashed to steam for turbine motive power, a system for removing noncondensable gases from said flow stream, which comprises:

heat exchange means;

separator means in said primary flow stream for diverting from said primary flow stream a secondary flow stream comprising a mixture of noncondensable gases and some steam, said separator means being connected to said heat exchange means for delivery of said secondary flow stream to said heat exchange means and flow of said secondary flow stream through said heat exchange means; and

a source of supply of substantially pure water in communication with said heat exchange means for delivery of said substantially pure water to said heat exchange means and flow thereof through said heat exchange means in a flow path that is separate from the flow path of said secondary flow stream through said heat exchange means;

heat from said steam in said secondary flow stream being

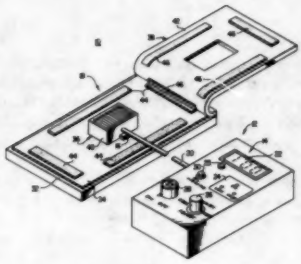
transferred in said heat exchange means to said substantially pure water causing said substantially pure water to boil for use as turbine motive steam, the resulting heat loss from said steam of said secondary flow stream causing said steam of said secondary flow stream to condense and thereby become separated from said noncondensable gases.

4,930,317

APPARATUS FOR LOCALIZED HEAT AND COLD THERAPY

Phillip P. Klein, Plano, Tex., assignor to Temperature Research Corporation, Plano, Tex.

Filed May 20, 1988, Ser. No. 196,741
Int. Cl.[5] F25B *21/02*
U.S. Cl. 62—3.3 **13 Claims**



1. A temperature controlled hot/cold producing pad comprising:

a therapeutic pad;

a hot/cold producing means mounted on the pad, said means having first and second opposing sides with the first side in thermal contact with the pad;

means in operative association with the second side of the hot/cold producing means for maintaining a working temperature difference at the second opposing end of the hot/cold producing means;

a temperature sensing means connected to the therapeutic thermal pad for sensing the pad's temperature;

a conduit means including electrical leads connected to the hot/cold producing means and temperature sensing means; and

a control means connected to the electrical leads for controlling operation of the temperature controlled hot/cold therapeutic pad;

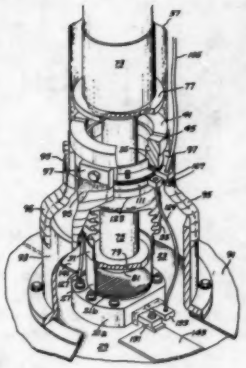
wherein the hot/cold producing means having first and second opposing sides includes a thermoelectric heat pump, and wherein the means in operative association with the second side of the opposing sides for maintaining a working temperature difference at the second opposing side includes a liquid cooled heat sink in thermal contact with the second hot/cold plate, said liquid cooled heat sink including a block of thermal conductive material with walls forming a passage for flowing liquid through the block for maintaining the operative temperature difference, the conduit means including first and second flexible conduits connected to the passage, and the control means includes a reservoir connected to the first flexible conduit for receiving and storing a liquid coolant, a radiator connected to the reservoir, a pump connected to the reservoir and to the second conduit means for pumping the liquid coolant from the reservoir through the radiator for heating extraction, second conduit, heat sink passage and return through the first conduit to the reservoir.

4,930,318

CRYOCOOLER COLD HEAD INTERFACE RECEPTACLE

Steven J. Brzozowski, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 215,114, Jul. 5, 1988, abandoned. This application May 5, 1989, Ser. No. 348,322
Int. Cl.[5] F25B *19/00*
U.S. Cl. 62—51.1 **3 Claims**



1. Superconductor magnet cooled by a multistage cyrocooler comprising;

a cryostat defining an opening;

a platform means situated inside the cryostat;

a first sleeve having a closed end and an open end, the closed end extending inside said cryostat with said closed end supported by said platform means, said sleeve having a first stage heat station contact means secured inside said sleeve, the portion of said sleeve extending between the heat station means and the closed end being axially flexible;

a second sleeve surrounding siad first sleeve, one open end of said second sleeve airtightly surrounding the perimeter of the cryostat opening, said second sleeve wall being axially flexible;

a first flange having a central aperture, said first flange airtightly secured to the first and second sleeves sealing the annulus formed between the first and second sleeves, the central aperture of the first flange being aligned with the first sleeve open end, siad first sleeve, second sleeve and first flange, airtightly sealing said cryostat opening; and

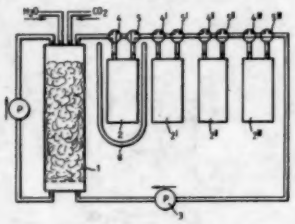
a second flange having a central opening adjustably airtightly secured in the central aperture of the first flange, said second flange adapted to be secured to said cryocooler when the cryocooler cold end is situated in said first sleeve such that evacuation of the cryostat and said first sleeve exerts pressure between the second stage of the cryocooler and the bottom of the first sleeve, and moving the first flange toward the second flange elongates the axial flexible portion of the first sleeve, increasing the force between the first stage heat station contact means and the first stage of the cryocooler.

4,930,319

SUBLIMATION METHOD

Rodney D. Bee, Eaton Ford, and Anthony M. Palmer, Podington, both of Great Britain, assignors to Thomas J. Lipton, Inc., Englewood Cliffs, N.J.

Filed Jun. 12, 1989, Ser. No. 366,614
Claims priority, application United Kingdom, Jun. 17, 1988, 8814477
Int. Cl.[5] F25C *1/00*
U.S. Cl. 62—69 6 Claims



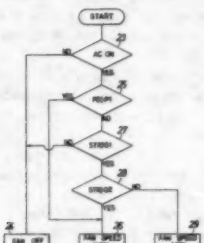
1. A method of preparing an edible gas-hydrate-clathrate comprising positively conveying at least one edible gas-hydrate-forming material in gaseous state and gaseous water as a mixture towards a predetermined spot and arranging conditions of temperature and pressure at said spot suitable for forming a gas-hydrate-clathrate of said material and water.

4,930,320

COOLING FAN CONTROLLING APPARATUS FOR VEHICLE WITH AIR CONDITIONER

Yutaka Ide, and Makoto Hasiguchi, both of Wako, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 8, 1989, Ser. No. 348,923
Claims priority, application Japan, May 16, 1988, 63-118968
Int. Cl.[5] F25B *39/04*
U.S. Cl. 62—184 6 Claims



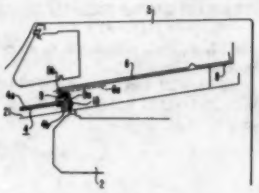
1. A cooling-fan controlling apparatus for an air conditioner system including a variable volume compressor, comprising:
- work-performed detecting means for detecting the work performed by the variable volume compressor;
- a condenser;
- a cooling fan for cooling said condenser; and
- a control means for controlling the drive speed of said cooling fan on the basis of the value detected in said work performed detecting means.

4,930,321

REFRIGERATED DISPLAY CASE WITH NIGHT COVER

Junichi Takahashi, Takasakishi, Japan, assignor to Sanden Corporation, Gunma, Japan

Filed Mar. 20, 1989, Ser. No. 325,531
Claims priority, application Japan, Mar. 18, 1988, 63-37042[U]
Int. Cl.[5] A47F *3/04*
U.S. Cl. 62—249 2 Claims



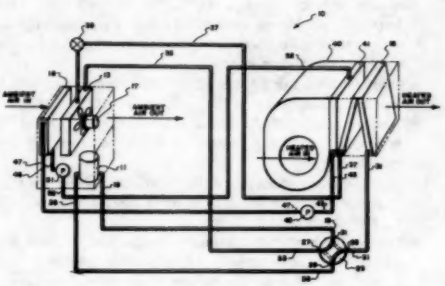
1. In a refrigerated display case comprising a cabinet having a top opening, at least one sliding door dimensioned to cover and uncover at least a portion of said opening and disposed in a frame having a leading edge and a trailing edge, and a night cover disposed within said cabinet above said door, the improvement comprising:
- a spacing member attached to the trailing edge of said frame member which compensates for any sagging in said night cover and spaces said night cover away from said door.

4,930,322

ADVANCED HEAT PUMP

Joseph L. Ashley, Fairfax, Va., and John D. Matthews, Simi Valley, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sep. 11, 1989, Ser. No. 405,828
Int. Cl.[5] F25D *21/00*
U.S. Cl. 62—271 14 Claims



14. A heat pump system for heating and cooling the interior of a building comprising:
- a compressor having an inlet port and a discharge port;
- a first condenser-evaporator having first and second inlet-outlet ports;
- a second condenser-evaporator having first and second inlet-outlet ports, the first inlet-outlet port of which is connected to the first inlet-outlet port of said first condenser-evaporator;
- an expansion valve connected between the first inlet-outlet port of said first condenser-evaporator and the first inlet-outlet port of said second condenser-evaporator;
- a four-way valve having a first port connected to the discharge port of said compressor, a second port connected to the inlet port of said compressor, a third port connected to the second inlet-outlet port of said first condenser-

evaporator, and a fourth port connected to the second inlet-outlet port of said second condenser-evaporator;

a first packed bed positioned on one side of said first condenser-evaporator, said first packed bed having an inlet port and an outlet port;

a fan positioned on the opposite side of said first condenser-evaporator;

an air blower positioned adjacent said second condenser-evaporator;

a second packed bed positioned between said air blower and said second condenser-evaporator, said second packed bed having an inlet port and an outlet port;

a first pump having an inlet port connected to the outlet port of said first packed bed and a discharge port connected to the inlet port of said second packed bed; and

a second pump having an inlet port connected to the outlet port of said second packed bed and a discharge port connected to the inlet port of first packed bed.

4,930,323

DOUBLE LOCKABLE SLIDERS

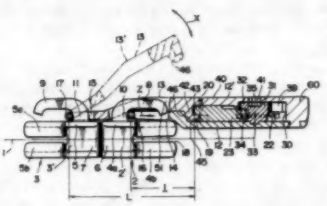
Yasuharu Terada, Uozu; Yoshiyuki Horita, Toyama, and Susumu Ishii, Kurobe, all of Japan, assignors to Yoshida Kogyo K. K., Tokyo, Japan

Filed Nov. 13, 1989, Ser. No. 434,429

Claims priority, application Japan, Nov. 25, 1988, 63-153343[U]

Int. Cl.[5] E05B *67/38*

U.S. Cl. 70—68 **8 Claims**



1. Double lockable sliders for slide fasteners comprising a pair of first and second sliders reciprocatively mounted on the slide fastener and disposed reversely to each other, each of said sliders including a slider body having an attachment lug on its upper surface and a pull tab adapted for manipulating the slider, the pull tab including a proximal portion having a pivotal portion connected with the attachment lug for both pivotal movement thereon and reciprocative movement therealong and a pull tab body extending integrally from the proximal portion, the first pull tab of a first slider further including a recess formed in one surface of the pull tab body close to proximal portion, a box-like portion having therein a chamber communicating with the recess, and a latch member having a prong at its one end, housed within the chamber for being reciprocatively movable longitudinally of the pull tab and normally urged so as to bring the prong into the recess; the second pull tab of a second slider further having at the distal end and on one surface thereof an engaging projection which, in turn, has an indentation in its side close the distal end of the second pull tab; when the first pull tab is turned flat against the first slider body and then the second pull tab is turned flat against the first pull tab, the engaging projection of the second pull tab coming into the recess of the first pull tab and the prong of the latch member resiliently coming into locking engagement with the indentation of the engaging projection; the double lockable sliders further including cam means for imparting to the engaging projection upward motion when the latch member is pulled away from the second slider longitudinally of the slide fastener.

4,930,324

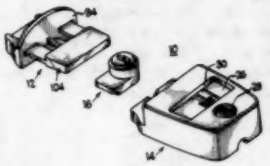
CENTER-RELEASE, LOCKABLE BUCKLE

Terrence P. Meier, Wheaton, Ill., assignor to Illinois Tool Works, Inc., Chicago, Ill.

Filed Oct. 30, 1989, Ser. No. 428,788

Int. Cl.[5] E05B *73/00*

U.S. Cl. 70—18 **11 Claims**



1. A lockable buckle comprising:

a housing defining an enclosure, a clasp port and a locking-tongue aperture;

a clasp member with a locking tongue, said clasp member insertable in said clasp port and enclosure to position said locking tongue in said locking-tongue aperture and to couple said clasp member and said housing in a coupled mode; and,

a tumbler with a projecting arm, which tumbler is mountable and rotatable in said enclosure to move said arm to prevent displacement of said tongue and to lock said clasp member in said housing.

4,930,325

PIVOT LEVER BAR CLOSURE

Dieter Ramsauer, Am Neuhauskothen 20, D-4620 Velbert 11, Fed. Rep. of Germany

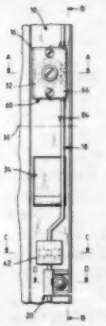
PCT No. PCT/DE87/00415, § 371 Date May 25, 1988, § 102(e) Date May 25, 1988

PCT Filed Sep. 12, 1987, Ser. No. 214,742

Claims priority, application Fed. Rep. of Germany, Sep. 25, 1986, 86113172

Int. Cl.[5] E05B *13/10*

U.S. Cl. 70—209 **18 Claims**



1. A pivot lever bar closure provided with a cylinder lock for installation in two rectangular apertures in a fillet cap of sheet metal cabinet doors, comprising a lock case with a pivot lever actuating device extending through a door panel to the outside for driving at least one closure bar of flat strip material extending parallel to a door edge, the lock case having a cylinder lock holding a pivot lever in a swung-in position, a receiving through for the pivot lever forming a base plate, the base plate connecting the bar closure with the door panel, the base

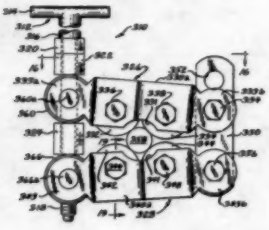
plate having one shoulder that is part of the lock case, said shoulder and another part of the lock case together clamping in the door panel in a region of a first aperture so as to center the base plate, the base plate having another shoulder forming a seat for the cylinder lock and being arranged in an end of the pivot lever, the other shoulder together with a holding part which extends from the other shoulder clamping in the door panel in a region of a second aperture so as to center the base plate, the shoulder which forms a seat for the cylinder lock reaching behind the aperture and carrying one of at least one undercut projection at an edge facing away from the other aperture and a holding part attachable to the shoulder for engaging the rim of the aperture.

4,930,326

MANUAL HOSE END CRIMPER

Robert B. Rottinghaus, 4121 S. Caufield Road, Jesup, Iowa 50648

Continuation-in-part of Ser. No. 197,155, May 23, 1988, Pat. No. 4,848,121. This application Feb. 21, 1989, Ser. No. 312,714
The portion of the term of this patent subsequent to Jul. 18, 2006, has been disclaimed.
Int. Cl.[5] B21D *17/04*
U.S. Cl. 72—35 **39 Claims**



1. A manually operated apparatus for crimping a ferrule onto the end of a hose, said apparatus comprising:

a plurality of roller means each having associated therewith respective axes of rotation;

a plurality of carrier means for engaging and supporting respective ones of said roller means in spaced relation;

first pivotal coupling means for pivotally coupling adjacent first ends of each of said plurality of carrier means in a rotationally displaceable manner;

a plurality of second pivotal coupling means each attached to respective adjacent second ends of said plurality of carrier means; and

manual control means coupled to each of said plurality of second pivotal coupling means for adjusting the spacing between said plurality of carrier means in positioning said plurality of roller means in tight fitting engagement with a ferrule disposed therebetween so as to exert a compressive force on the ferrule;

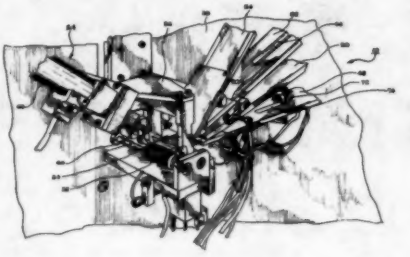
wherein the rotational axes of said roller means are oriented at an angle relative to a longitudinal axis of the ferrule such that rotation of the crimping apparatus about the ferrule's longitudinal axis causes said roller means to follow a spiral path along the length of the ferrule in crimping the ferrule to the end of the hose.

4,930,327

BATTERY CORE WRAPPING METHOD AND APPARATUS

Stephen H. Aidlin; Bradley E. Reed, and John B. Strassner, all of Sarasota, Fla., assignors to Aidlin Automation Corp., Sarasota, Fla.

Filed Dec. 27, 1988, Ser. No. 290,263
Int. Cl.[5] B21C *47/04*
U.S. Cl. 72—148 **3 Claims**



1. A system for the fabrication of rechargeable battery cores formed of component layers of electrically conductive layers and inter-leafed electrically insulating layers in a coil-like manner comprising:

an arbor rotatable about its axis for the receipt and support of the core component layers and for winding such core component layers thereon;

associated support roller means located adjacent to the arbor for forming a nip and for feeding the component layers to and around the arbor, the arbor being mounted to raise with respect to the support roller means as the component layers are wrapped therearound;

tray means positioned adjacent to the arbor and support roller means to support and feed the component layers along separate paths of travel to the nip and around the arbor; and

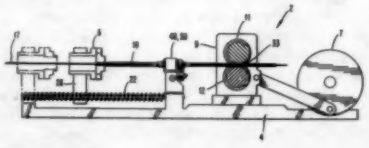
a tucker bar operatively associated with the arbor and support roller means, said tucker bar being mounted for movement between said tray means and said arbor on a component layer infeed side of said arbor and along a line of movement which extends across said paths of travel of the component layers for moving leading edges of the insulating component layers into a position for being wrapped around the arbor prior to the feeding of the conductive component layers to said rotatable arbor.

4,930,328

METHOD AND APPARATUS FOR RELOADING A PILGERING MILL

Anthony A. Duerring, Kennewick, Wash., assignor to Sandvik Special Metals Corp., Kennewick, Wash.

Filed Jan. 17, 1989, Ser. No. 297,431
Int. Cl.[5] B21B *17/06, 21/00*
U.S. Cl. 72—208 **16 Claims**



1. A method of reloading a pilgering mill of the type having

a pair of forming rolls with tube-forming grooves disposed thereon, a first hollow workpiece positioned at a location adjacent the rolls and a mandrel disposed within the hollow workpiece, comprising the steps of:

a. clamping said first workpiece with a first pressure sufficient to hold said first workpiece stationary in the axial direction;

b. retracting said mandrel relative to said first workpiece while said first workpiece is held stationary by said first pressure;

c. sliding at least one additional workpiece over a retracted portion of said mandrel;

d. reducing said first pressure to a second pressure which is sufficient to yieldably resist axial movement of said first workpiece at the start-up of a subsequent rolling operation;

e. beginning a rolling operation by reciprocating said forming rolls against said first workpiece while said first workpiece is held by said second pressure; and

f. maintaining said second pressure while said first workpiece becomes deformed tightly against said mandrel.

4,930,329

INSTALLATION FOR PRODUCING METAL GIRDERS

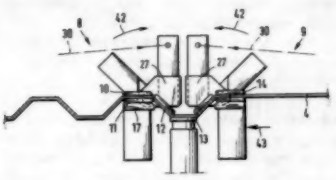
Friederich Hasenkamp, Nettetal, Fed. Rep. of Germany, assignor to Maschinenbau Gerold GmbH & Co. KG, Nettetal, Fed. Rep. of Germany

Filed Sep. 27, 1988, Ser. No. 249,969

Claims priority, application Fed. Rep. of Germany, Oct. 28, 1987, 3736394

Int. Cl.[5] B21D *11/02*

U.S. Cl. 29—897.35 **9 Claims**



1. An installation for continuous production of girders having a longitudinal axis, at least one flange and a web fixed to the flange and extending generally perpendicular thereto, said flange and web having longitudinal lengths extending along the longitudinal axis of said girder, said installation comprising shaping apparatus for shaping first strip material having a longitudinal length continuously in incremental steps along its length to produce said web with a non-planar configuration and a welding station for welding second strip material which forms said flange to said web, said shaping apparatus including a pair of relatively displaceable clamping and bending units which are spaced apart along the longitudinal length of the first strip material, said units cooperating to clamp the first strip material selectively and to bend a region of the first strip material between the units with relative displacement of the units along the longitudinal length of the strip material, each of said bending units comprising a pair of clamping jaws which are relatively moved together and apart to clamp and release the strip of material and a bending jaw which is displaced separately to deform and bend said region of strip material, one of the jaws of each of said units being supported by a displaceable slide which is moved toward and away from other jaws of said unit with a hydraulic ram for displacement of the displaceable slide.

4,930,330

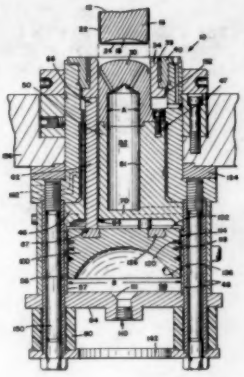
DOUBLE ACTION BOTTOM FORMER

Gale Weishalla, Maple Grove, Minn., assignor to Pride Machine Inc., Fridley, Minn.

Filed Jul. 27, 1989, Ser. No. 386,296

Int. Cl.[5] B21D *22/30, 22/00*

U.S. Cl. 72—348 **27 Claims**



27. A method for absorbing the mechanical shock of a metal shaping machine during high speed and high throughput manufacture comprising the steps of:

(a) providing an integral cylinder housing member having first and second end portions, the first end portion comprising an elongate cylinder with sidewalls defining a first axial chamber with a first diameter, the second end portion comprising a cylinder with sidewalls defining a second axial chamber with a second diameter larger than the first diameter, the first and second axial chambers being separated by an integral chamber separator, the integral cylinder housing member first end portion sidewalls comprising a plurality of axially oriented bores extending from the cylinder housing member first end portion through the integral chamber separator into the second axial chamber;

(b) inserting a plurality of slidable pushrods into the integral cylinder housing member first end portion sidewall bores, each of the pushrods having a first end and a second end;

(c) mounting tool set means at the integral cylinder housing member first end portion, the tool set means comprising a ring former and a dome former for contacting and shaping a metal can blank, the ring former radially located around the dome former and in abutting engagement with the first end of each of the pushrods;

(d) configuring piston means to provide suspension for the pushrods, the piston means comprising a piston member movably positioned within the integral cylinder housing member second axial chamber, the piston member comprising a contact surface facing the integral chamber separator for contact with the second end of each of the pushrods extending through the integral chamber separator and a receiving surface substantially opposite the contact surface for receiving a pressurized medium; and

(e) arranging a cover plate across the diameter of the second axial chamber and operatively biasing the cover plate axially against the integral cylinder housing member second end portion sidewalls;

(f) routing a pressurized medium into the second axial chamber to provide force against the piston member receiving surface so that as a metal blank is forced into contact with the tool set means the force of that contact is transferred through dual action of the ring former axially by the pushrods to the piston member and by the dome former substantially axially through the integral cylinder housing

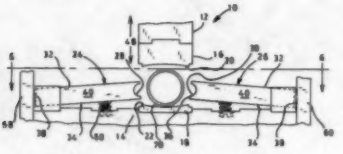
member sidewalls to the biased cover plate to permit high throughput metal shaping manufacture.

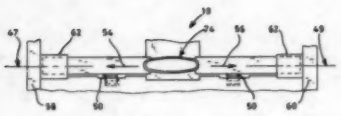
4,930,331

APPARATUS AND METHOD FOR FABRICATING ELLIPTICAL TUBING

Douglas E. Manning, 7300 Rule Rd., SW., Knoxville, Tenn. 37920

Filed Feb. 24, 1989, Ser. No. 315,284
Int. Cl.[5] B21D 7/00
U.S. Cl. 72—396 9 Claims





1. An apparatus for fabricating metal tubing having a generally elliptical cross-section, said generally elliptical tubing having first and second opposing substantially flattened sides and first and second opposing substantially rounded sides joining said first and second, opposing flattened sides, from generally round tubing stock with a press having a pair of opposing platens, said apparatus comprising:

a first pair of opposing dies secured to said opposing platens of said press, said first pair of dies having die faces of preselected shape for forming said first and second opposing substantially flattened sides of said generally elliptical tubing;

a second pair of opposing dies having die faces defining a substantially concave shape for forming said first and second opposing substantially rounded sides of said generally elliptical tubing, said second pair of opposing dies being positioned substantially between and on either side of said first pair of opposing dies such that said die faces of said second pair of opposing dies are engaged by said substantially rounded sides of said generally elliptical tubing when said generally elliptical tubing is pressed between said first pair of opposing dies, said second pair of opposing dies being disposed at substantially right angles to said first pair of opposing dies and movable separately from said first pair of opposing dies; and

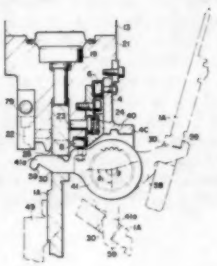
means for providing a preselected resistance to the movement of said second pair of opposing dies in a direction perpendicular the relative direction of movement of said platens of said press whereby said generally round tubing stock can be pressed between said die faces of said first pair of opposing dies until said tubing stock engages said die faces of second pair of opposing dies thereby pressing said tubing stock into said generally elliptical shape defined by said die faces of said first and second pairs of opposing dies.

4,930,332

APPARATUS FOR EXCHANGING TOOL FOR BENDING MACHINE

Toshio Hongo, Ichikawa, Japan, assignor to Maru Kikai Kogyo Co., Ltd., Japan

Continuation of Ser. No. 67,448, Jun. 26, 1987, abandoned. This application Sep. 13, 1989, Ser. No. 406,835
Claims priority, application Japan, Jun. 30, 1986, 61-151403
Int. Cl.[5] B21J 13/02
U.S. Cl. 72—446 11 Claims



1. An apparatus for exchanging a tool of a bending machine comprising:

a frame,

a ram movably mounted on said frame, a drive unit connected to said frame for moving of the ram in an upward and a downward direction, said ram having a front side and rear side,

a reversible supporting shaft unit having an axis and being rotatably mounted on said frame to the rear side of said ram for rotation about said axis,

a plurality of dies movably mounted on said frame, said dies mounted in side-by-side relation and located in parallel relationship to said shaft unit,

a reversing lever unit secured to said reversible supporting shaft unit, said reversing lever unit projecting outwardly from said shaft unit and having an outer die mounting end portion thereon, said die mounting end portion of said reversing lever unit being coupled to said dies, said reversing lever unit locating said dies relative to said ram when rotating by said shaft unit, and

a positioning unit for selectively positioning said reversing lever unit on said reversible supporting shaft unit to thereby enable selective positioning of said dies, upon rotation of said shaft unit, between a coupling position with said ram and an uncoupling position spaced from said ram.

4,930,333

VEHICLE ALIGNMENT APPARATUS

Lynwood E. Marbury, 4905 Leisure Dr., Dunwoody, Ga. 30338

Filed Jul. 17, 1989, Ser. No. 380,607
Int. Cl.[5] B21D 1/12
U.S. Cl. 72—447 19 Claims

1. An apparatus for realigning damaged vehicle bodies with said apparatus comprising:

a vehicle support platform having a front end portion, a rear end portion and side portions;

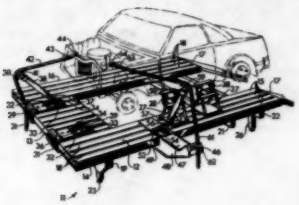
means for securing a damaged vehicle on said platform;

an elongated stress bearing plate having first and second ends;

platform engaging means at said first end of said stress bearing plate for releasibly engaging an end portion of said platform with said plate positioned to overlie a portion of said platform; and

means for applying aligning force to a vehicle secured to

said platform including an elongated flexible member secured at one end to said platform engaging means and adapted to be secured at its other end to a selected portion of the vehicle, and tensioning means mounted on said plate



for applying tension to said flexible member intermediate the ends thereof,

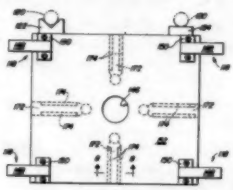
whereby force is applied to the vehicle upon activation of said tensioning means causing the vehicle body to be pulled into realignment.

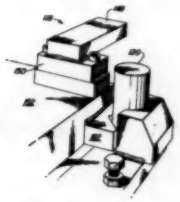
4,930,334

QUICK CHANGE STRUCTURE FOR TRIM DIE

Edgar J. Buehler, Pewaukee; James H. Draeger, Beaver Dam, and Rayment G. Koopmans, Fox Lake, all of Wis., assignors to Deere & Company, Moline, Ill.

Filed Jul. 25, 1989, Ser. No. 385,602
Int. Cl.[5] B21J *13/00*
U.S. Cl. 72—448 **16 Claims**





1. An improved die changing apparatus usable with a trim die having an upper die section and a lower die section, the lower die section including a part locator member having a post means extending through an opening in the lower die section; said die being usable on a press having a ram and a shiftable bed, the bed including an opening through which the post means can be placed, the improvement comprising:

at least two spaced apart lift means carried on an upper portion of the lower die section;

engageable locator means carried on the bed and lower die section for laterally and transversely positioning the trim die relative to the bed; and

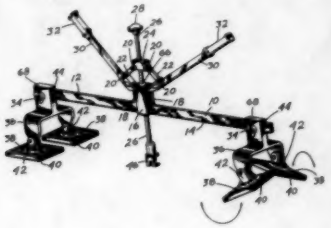
means for coupling the post means with the press including an adaptor being rigidly connected to the post means and being positioned substantially within the opening of the lower die section and an insert carried within the opening of the bed, said insert being secured to the press, and projecting above the bed and being engageable with the adaptor.

4,930,335

LEVER-TYPE AUTO BODY DENT PULLER

Kosei Ishihara, c/o Kazuo Wachi, 755 E. 8th St., Chico, Calif. 95928

Filed Jul. 3, 1989, Ser. No. 375,351
Int. Cl.[5] B21D *1/12*
U.S. Cl. 72—451 **5 Claims**



1. A levering apparatus for auto body dent pulling comprising:

a bridge bar,

said bridge bar being an elongated bar horizontally disposed,

said bridge bar slidably fitted adjacebt opposite terminal ends with downward disposed legs having pivotal feet thereon;

said bridge bar adapted upwards for pivotal attachment of two levering arms one adjacent each side of a centrally positioned bore passed vertically through said bridge bar;

a pull rod,

said pull rod being a vertically disposed rod passed freely through said bore in said bridge bar retained adjustably by a collar,

said collar positioned immediately above said bridge bar aligning said pull rod with said bore in said bridge bar;

linkage,

said linkage pivotally affixing said levering arms to said collar providing fulcrum attachment moving said pull rod upwards and downwards through said bore in said bridge bar relative to reverse movement of free ends of said levering arms;

means for temporary retention of said slidably fitted downward disposed legs in a fixed position on said bridge bar;

means for adjusting upward and downward position of said pull rod in said collar;

means for attachment of hooking fixtures on a terminal end of said pulli rod below said bridge bar.

4,930,336

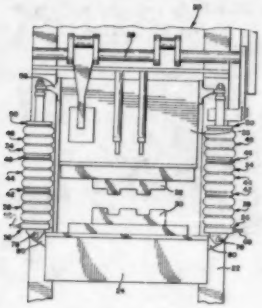
SINGLE ACTION CYLINDER

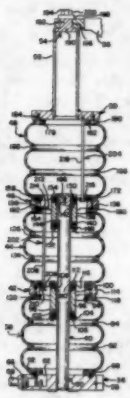
Kenneth L. Smedberg, 5 Oak Hill Drive, Crete, Ill. 60417; George J. Bozich, Chicago, and Robert J. Kotynski, South Holland, all of Ill., assignors to Kenneth L. Smedberg, Crete, Ill.

Continuation-in-part of Ser. No. 6,732, Jan. 22, 1987, Pat. No. 4,825,681. This application Jan. 30, 1989, Ser. No. 304,186
Int. Cl.[5] B21D *24/02*
U.S. Cl. 72—453.13 **21 Claims**

1. A single action cylinder for affecting reciprocation between a first part and a second part having reciprocating motion relative to each other in a machine comprising, a base adapted for attachment to said first part, a plurality of open ended longitudinally extendable resilient actuators stacked one above the other, a first actuator of said actuators having one end connected to the base, each of said actuators having an

open end interconnected to an open end of an adjacent actuator to allow a fluid to flow from one actuator to another, a second actuator of said actuators having one end connected to means for attaching said second actuator to said second part, and an elongated guide connected to either the first or second of said actuators to limit movement of that actuator in a direction transverse to the length of the guide, another one of said





actuators having one end free to move in all directions relative to said guide, whereby freedom of movement of said one end of said another one of said actuators allows the cylinder to affect reciprocation between the first part and the second part without creating extraneous loadings on said first and second parts because of imperfect alignment between the first and second parts and the single action cylinder.

4,930,337

AUTOBODY DOOR ALIGNING TOOL

Herm Schaap, Sparta, Canada, assignor to Levrite Inc., Ontario, Canada

Filed May 12, 1989, Ser. No. 350,977
Int. Cl.[5] B21D *1/12*
U.S. Cl. 72—458 **12 Claims**

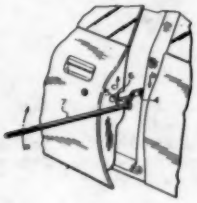
1. An autobody door latch alignment tool including:

a strike pin engaging means adapted to engage, and be rotatable about at strike pin mounted on a first door post of an autobody opposite a second door post arranged apart from and generally parallel to the first door post;

a door latch engaging means adapted to engage a door latch on a misaligned door that it is hung by hinges from the second door post of said autobody, said door latch engaging means being arranged in mutually spaced apart relation from the strike pin engaging means at respective points defining a chord along an arc subtended by an angle of said doors rotation about said hinges; and,

lever arm means;

said door latch engaging means and strike pin engaging means being interconnected through interconnecting means wherein a first portion thereof extends in a first direction from said strike pin engaging means along one side of said chord opposite of said arc to a second portion extending in a second direction transversely of said chord, to a third portion extending in a third direction, on a side



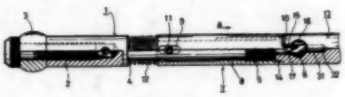
of said chord adjacent said arc and towards said door latch engaging means, said interconnecting means adapted to be secured in fixed relation with said lever arm means, in which arrangement the strike pin engaging means is operable to act as a fulcrum when securely engaged in rotatable relation with the strike pin, in response to an application of leverage through lever arm means from a point remote from both the strike pin engaging means and the door latch engaging means and the door latch engaging means is operable in conjunction therewith and when engaged with the door latch, to exert a corrective bending moment through the door to the hinges thereof.

4,930,338

PIPE EXPANDING MANDREL

Kengi Tokura, Osaka, Japan, assignor to Kyoshin Kogyo Kaburshiki Kaisha, Osaka, Japan

Filed Feb. 14, 1989, Ser. No. 309,871
Int. Cl.[5] B21D *41/02*
U.S. Cl. 72—479 **8 Claims**



1. A pipe expanding mandrel comprising:

a set pin having a pipe expanding billet located on a front end portion thereof and having a reduced stepped portion formed behind the billet;

a sleeve fitted on the set pin at a position behind the reduced stepped portion and having axially oriented elongate slots formed therein, the elongate slots being engaged by a turn stopper pin extending transversely through the set pin;

a spring interposed between the reduced stepped portion of the set pin and the front end of the sleeve and which urges the reduced stepped portion and the front end of the sleeve away from each other;

means, including an engagement protuberance and an engagement hole, for coupling the set pin and a mandrel shaft together, said engagement protuberance being located on one of said set pin or mandrel shaft and the engagement hole being located on the other, free from the

possibility of their becoming disengaged from each other, when the engagement protuberance is brought in engagement with the engagement hole and turned a predetermined degree;

means, including engagement lugs and an engagement groove, for coupling the sleeve and the mandrel shaft together, said engagement lugs being located on one of said sleeve or mandrel shaft and the engagement groove being located on the other, free from the possibility of their turning, when the engagement lugs are brought in engagement with the engagement groove; and

an extension shaft portion extending from the rear end of the engagement protuberance and a hole bored at the back of the engagement hole thereof, said extension shaft portion and hole constituting means for further coupling the set pin and the mandrel shaft together by bringing the extension shaft portion in engagement with the hole.

4,930,339

TABLE WITH ADJUSTABLE CONVEXITY FOR A PRESS BRAKE, BED OR THE LIKE

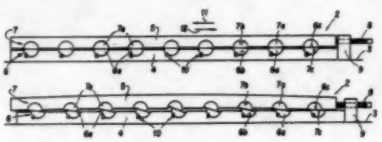
Florent Corsini, Chassieu, France, assignor to Ets A. Colly, Villeurbanne, France

Filed May 18, 1989, Ser. No. 353,551

Claims priority, application France, Feb. 5, 1988, 88 01815

Int. Cl.[5] B21D *5/02*

U.S. Cl. 72—482 **12 Claims**



1. A table with adjustable convexity, comprising:

a substantially horizontal upper plate;

a substantially horizontal lower plate;

a row of upper blocks superimposed on lower blocks forming pairs of wedges with opposing surfaces between said upper plate and said lower plate;

means for independently adjusting angular slopes of the opposing surface of each said pair of wedges independently of the opposing surfaces of each other said pair of wedges; and

means for shifting one said plate relative to the other said plate in a first direction which causes said upper blocks to shift vertically relative to said lower blocks and causes changes in convexity of said upper plate as a function of said independently adjusted angular slopes;

wherein each said upper block and each said lower block has a substantially semicylindrical shape whose generatrices are oriented transversely to said first direction.

4,930,340

CALIBRATION BRACKET FOR VEHICLE HEIGHT SENSOR

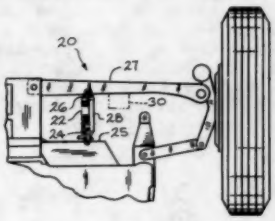
Anthony C. Evans, Northville, Mich., assignor to Kelsey-Hayes Company, Romulus, Mich.

Filed Sep. 19, 1989, Ser. No. 409,354

Int. Cl.[5] B60G *11/26*

U.S. Cl. 73—1 J **3 Claims**

1. An assembly comprising a height sensor for an automotive vehicle, the height sensor including a telescoping housing and shaft each provided with a boss, and an elongate calibration bracket having a pair of apertures disposed respectively adjacent opposite ends and respectively receiving said bosses, whereby the calibration bracket temporarily locks the housing



and shaft in a predetermined relationship with respect to each other.

4,930,341

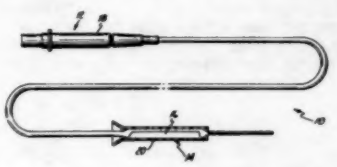
METHOD OF PREPPING A DILATATION CATHETER

Charles L. Euteneuer, St. Michael, Minn., assignor to SciMed Life Systems, Inc., Maple Grove, Minn.

Filed Mar. 15, 1989, Ser. No. 323,686

Int. Cl.[5] G01M *3/02*

U.S. Cl. 73—37 **14 Claims**



1. A method of preparing a dilatation catheter prior to use in an angioplasty procedure, the method comprising:

providing the dilatation catheter with a balloon protector over a balloon at a distal end of the catheter with the balloon being in an initial uninflated state;

priming the balloon with the balloon protector in place over the balloon, whereby the balloon protector maintains the balloon in its uninflated state during priming; and

removing the balloon protector from the distance end of the catheter.

4,930,342

CONTAINER LEAK DETECTOR

P. K. McDaniel, Richland, Wash., assignor to Seal Integrity Systems, Inc., Richland, Wash.

Continuation-in-part of Ser. No. 938,027, Dec. 4, 1986, Pat. No. 4,747,298. This application Oct. 6, 1987, Ser. No. 106,229

Int. Cl.[5] G01M *3/32*

U.S. Cl. 73—49.3 **33 Claims**

1. A container testing apparatus for nondestructively testing a sealed container by applying a differential pressure to the container about limited annular portions of exterior surfaces of the container to aid in detecting leaks therein, comprising:

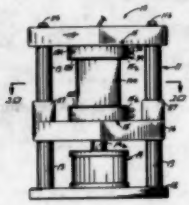
a frame;

at least one testing head mounted to said frame and having a container receptacle sized for receiving and surrounding an end of the container therein;

first sealing means within the receptacle for engaging and sealing against exterior surfaces of the container along a first annular seal at an end of the container;

second sealing means within the receptacle for sealing against exterior surfaces of the container along a second annular seal spaced from the first annular seal;

seal actuation means for controllably moving at least one of said first or second sealing means between extended and retracted positions; the seal actuation means including an annular deflection ring for controllably deflecting a flexible sealing member forming at least part of at least one of said sealing means; and wherein the deflection ring is movable relative to the sealing member and includes at least one axial extension which engages the sealing member upon movement of the sealing member and deflection ring relative to one another to thereby move the sealing member away from container surfaces;



said first and second sealing means defining at least portions of an annular testing fluid chamber adapted to apply a differentially pressurized testing fluid about an annular testing zone portion of the exterior surfaces of the container when said first and second sealing means are in sealing engagement against the container; and

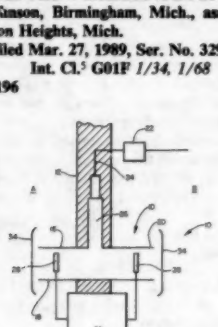
means for providing a desired differential pressure within the testing fluid chamber and against the annular portion of the container which is being tested.

4,930,343

APPARATUS FOR MEASURING AND CONTROLLING FLUID FLOW ACROSS A BOUNDARY

Jeffrey C. Johnson, Birmingham, Mich., assignor to Haden, Inc., Madison Heights, Mich.

Filed Mar. 27, 1989, Ser. No. 329,344
Int. Cl.[5] G01F *1/34, 1/68*
U.S. Cl. 73—196 **5 Claims**



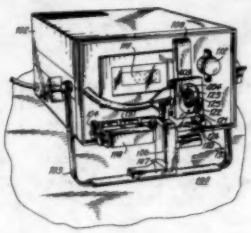
1. In a paint spraybooth facility including a spraybooth enclosure wall having at least one opening creating an air flow passageway between the inside and the outside of said spraybooth, an apparatus for measuring an air flow through said opening of between 20 and 150 feet per minute, comprising: a conduit positioned to bridge said enclosure wall and having two open ends, one of said open ends being located on one side of said enclosure wall and the second of said open ends being located on the other side of said enclosure wall; supply means for introducing a predetermined flow of control air into said conduit at a point intermediate said two ends; and two intrinsically safe air flow sensors mounted within said conduit on opposite sides of said intermediate point, said air flow sensors including means for generating at least one output signal responsive to the fluid flow through said passageway.

4,930,344

INSTRUMENT FOR MEASURING PACKAGE SEALS

J. Jerome Fleenor, Midlothian; Christopher N. Chance, Richmond, and Robert T. Mitten, Glen Allen, all of Va., assignors to Philip Morris Incorporated, New York, N.Y.

Filed Mar. 30, 1989, Ser. No. 331,598
Int. Cl.[5] G01M *3/32*
U.S. Cl. 73—49.3 **20 Claims**



1. An apparatus for testing the quality of a seal on a package overwrap comprising:

(a) means for creating a hole in the overwrap without breaching the integrity of the package;

(b) air pressure means for introducing super-atmospheric air pressure between the overwrap and the package through the hole; and

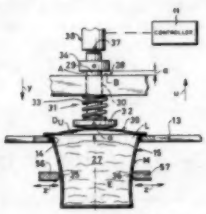
(c) means for determining whether the rate of air leakage from the overwrap is within acceptable limits.

4,930,345

SYSTEM FOR CHECKING SEALS IN A PACKAGING PLANT

Franz-Hubert Bausch, Wuppertal, Fed. Rep. of Germany, assignor to Hamba Maschinenfabrik Hans A. Muller GmbH & Co. KG, Wuppertal, Fed. Rep. of Germany

Filed May 6, 1988, Ser. No. 191,288
Claims priority, application Fed. Rep. of Germany, May 14, 1987, 3716095
Int. Cl.[5] G01M *3/36*
U.S. Cl. 73—45.4 **17 Claims**



1. In a packaging process where a succession of vessels are filled and each filled vessel has a rim to which is sealed a flexible cover disk, a method of checking the package seal comprising the steps of simultaneously:

(a) supporting said succession of filled vessels by respective

rims so that bodies of the filled vessels hang freely downwardly below supported portions of the vessels;

(b) advancing said vessels suspended at said portions in succession to a checking location; and

(c) at said location and in succession for the vessels monitoring the position of each cover disk of the respective vessels, inwardly elastically deflecting at least one of the walls of each vessel at the body thereof below the respective supported position during monitoring of the position of the respective cover disk and thereby decreasing the volume defined within the vessel, whereby the disk thereof is bulged outward above the respective supported location only when the vessel is sealed, and

generating an output based on the monitored position of the disk the respective disk is bulged outward.

4,930,346

METHOD FOR THE DETERMINATION OF THE PROPERTIES OF MOULDABLE MATERIALS, PARTICULARLY FOR THE DETERMINATION OF THE PLASTIC AND REOLOGIC PROPERTIES THEREOF

Ilmari Paakkinen, PPA 1 Moinsalmi SF-57230, Savonlinna, Finland; Erik T. Nordenswan, Oslo, Norway, and Heikki O. Rantanen, Toijala, Finland, assignors to Ilmari Paakkinen, Savonlinna, Finland

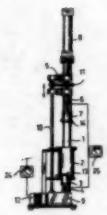
PCT No. PCT/FI87/00129, § 371 Date Mar. 30, 1989, § 102(e) Date Mar. 30, 1989, PCT Pub. No. WO88/02481, PCT Pub. Date Apr. 7, 1988

PCT Filed Sep. 24, 1987, Ser. No. 340,417

Claims priority, application Finland, Oct. 2, 1986, 863993

Int. Cl.[5] G01N *11/14, 33/38*

U.S. Cl. 73—59 **8 Claims**



1. A method for determining plastic and rheological properties of a moldable material, comprising:

(a) taking a sample of known weight from a mass of a moldable material;

(b) confining the sample in a mold having a sample-surrounding sidewall and two opposed pistons having respective axially-opposite inner end walls which define with said sidewall a mold cavity within which said sample is contained, said sidewall having a longitudinal axis, said inner end walls of said pistons being planar, parallel to one another and inclined at a given angle of inclination with respect to said longitudinal axis;

(c) advancing one of said pistons relatively towards the other of said pistons until both said inner end walls engage said sample and said sample is subjected to a constant pressure;

(d) while maintaining said constant pressure, coordinately changing the angle of inclination of said piston end surfaces by exerting a rotational force on said pistons, so that the magnitude of inclination of said end surfaces remains constant, but the direction each faces rotates around said longitudinal axis, whereby said pistons exert a shear compaction effect on said sample;

(e) measuring from said sample the magnitude of the torque resisting said rotational force, at at least one predetermined shear speed, as an indication of plastic and rheological properties of said moldable material.

4,930,347

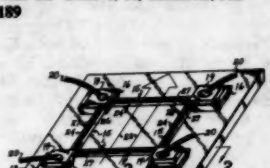
SOLID STATE MICROANEMOMETER WITH IMPROVED SENSITIVITY AND RESPONSE TIME

H. Thurman Henderson, Cincinnati, Ohio, assignor to University of Cincinnati, Cincinnati, Ohio

Filed May 23, 1989, Ser. No. 355,980

Int. Cl.[5] G01F *1/68;* **H01L** *21/302*

U.S. Cl. 73—189 **39 Claims**



1. A solid state microanemometer comprising:

a non-conductive base having a top surface;

four semiconductor supports located above said top surface; and

a Wheatstone bridge comprising four semiconductor resistor legs interconnected in a substantially common plane to four electrically conductive contacts located on top of said four supports, said common plane being at a predetermined distance above said top surface, thereby to substantially thermally isolate said resistors from said base and said supports.

4,930,348

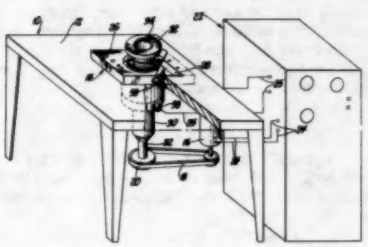
VERTICAL BALANCING MACHINE WITH CARTRIDGE ASSEMBLY

Deb K. Bandhopadhyay, Rochester Hills; Thomas A. Greenlees, Troy, and David L. Rubbelke, Rochester Hills, all of Mich., assignors to Balance Engineering Corporation, Troy, Mich.

Filed Nov. 25, 1988, Ser. No. 276,027

Int. Cl.[5] G01M *1/04, 1/22*

U.S. Cl. 73—472 **7 Claims**



1. A vertical balancing machine comprising;

a base carrying a horizontal support plate having an aperture,

a suspension cartridge secured to the support plate for assembly and removal as a unit and at least in part depending through the aperture,

the suspension cartridge having a pair of vertically spaced, rigidly interconnected suspension elements, each suspension element having an associated transducer for sensing unbalance signals, and a vertical spindle journaled in a spindle support in the suspension elements,

each suspension element comprising a suspension plate rigidly connected to the support plate, the suspension plate

having an opening for receiving the spindle support and slot means in the suspension plate for enabling flexing between the opening and the support plate, and

motor means supported on the base in driving relation to the spindle.

4,930,349

GAS RATE SENSOR

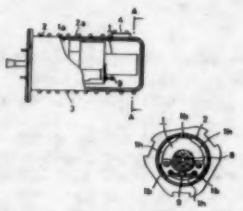
Fumitaka Takahashi, Wako; Kunio Okazaki, Hatano; Masaru Shiraishi, Tokyo; Masayuki Takahashi, Hatano; Kazufumi Ohara, Tokyo; Koji Yorimoto, and Tohru Tanabe, both of Yokohama, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha & Stanley Electric Co., Tokyo, Japan

Filed May 12, 1988, Ser. No. 193,404

Claims priority, application Japan, May 29, 1987, 62-131327; May 29, 1987, 62-131329

Int. Cl.[5] G01P *9/00*

U.S. Cl. 73—497 **3 Claims**



1. A gas rate sensor assembly, which comprises:

a metallic casing formed with a chamber and having heater wires wound about an outer surface thereof;

a holder assembly having a metallic body portion formed with a plurality of peripherally disposed and outwardly extending projections, each projection having a contacting surface, said holder assembly disposed in said chamber of said metallic casing defining a gas flow passageway therebetween, said contacting surface of said projections being compressed contacting relationship with said metallic casing; and

a first temperature detection element mounted to said metallic body portion of said holder assembly in said gas flow passageway and a second temperature detection element mounted on said outer surface of said metallic casing and cooperating with said first temerature detection element mounted to said metallic body portion for controlling power level to said heater wires.

4,930,350

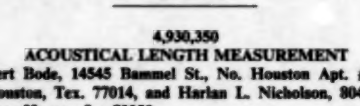
ACOUSTICAL LENGTH MEASUREMENT

Robert Bode, 14545 Bammel St., No. Houston Apt. #1205, Houston, Tex. 77014, and Harlan L. Nicholson, 804 First Ave., Harvey, La. 70058

Filed Oct. 6, 1988, Ser. No. 254,222

Int. Cl.[5] G01N *29/04*

U.S. Cl. 73—597 **15 Claims**



1. An apparatus for measuring the length of a tubular body comprising:

a. means for transmitting an acoustical signal along the interior of said tubular body, said transmitting means being positioned at the first end of said tubular body, closure means being provided at said first end of said tubular body;

b. means provided at the other end of said tubular body for reflecting said transmitted acoustical signal;

c. means for measuring the period of time for said acoustical signal to be transmitted along said tubular body from said transmitting means to the other (second) end of said tubular body and be reflected back to said first end thereof;

d. a plurality of acoustical receiving means mounted on an elongated probe extending from said enclosure means and provided along the central axis of said tubular body for measuring the speed of sound therein, said first acoustical receiving means being positioned in said tubular body forward of and adjacent to said acoustical transmitting means; and,

e. means connected to said measuring means and said acoustical receiving means for calculating the length of said tubular body as a function of said period of time and the speed of sound in said tubular body.

4,930,351

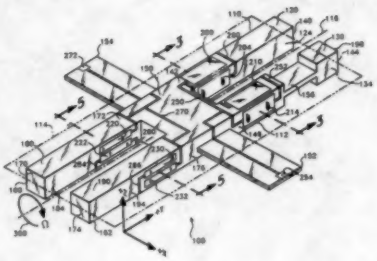
VIBRATORY LINEAR ACCELERATION AND ANGULAR RATE SENSING SYSTEM

David F. Macy, Mission Viejo, and Evert C. Alsenz, Newport Beach, both of Calif., assignors to WJM Corporation, Laguna Hills, Calif.

Filed Mar. 24, 1988, Ser. No. 172,380

Int. Cl.[5] G01P *9/04*

U.S. Cl. 73—505 **10 Claims**



8. An apparatus for sensing acceleration, comprising:

a common base;

a first vibrating element connected to said common base that vibrates in a first plane;

a second vibrating element that vibrates in said first plane, said second vibrating element having an end portion supported by an intermediate portion, said intermediate portion having enhanced flexibility in directions perpendicular to said first plane, and said end portion responsive to a component of acceleration in one of said perpendicular directions to cause said end portion to vibrate in a second plan parallel to said first vibration plane thereby causing a torsional effect at said common base;

a first sensing element connected to said common base, said first sensing element vibrating in a third plane, perpendicular to said first plane in response to said torsional effect at said base, said first sensing element including sensing electrodes for sensing an electrical effect induced in said first sensing element when said first sensing element is vibrating in said third plane; and

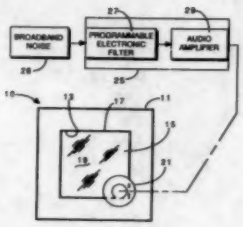
a sensing circuit connected to said sensing electrodes that receives said sensed electrical effect and that generates an output signal having a magnitude representing said component of acceleration.

4,930,352

REFLECTIVE MEMBRANE OPTICAL SCINTILLATOR

Jack H. Parker, Jr., and Mark L. DeLong, both of Kettering, Ohio, assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Mar. 30, 1989, Ser. No. 330,840
Int. Cl.[5] G01M 7/00
U.S. Cl. 73—662 8 Claims



1. An optical scintillation system for simulating optical atmospheric turbulence effects, comprising:

(a) a substantially rigid frame defining an opening of preselected size and shape;

(b) a membrane stretched on said frame within said opening, said membrane supporting a reflective surface;

(c) means for holding said membrane on said frame and providing a well defined boundary for vibrational excitation of said membrane;

(d) a source of light and optical means for directing a collimated light beam onto said membrane; and;

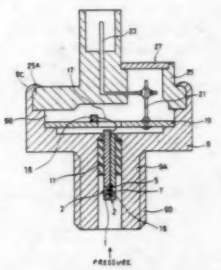
(e) acoustic means for controllably vibrationally exciting said membrane with a preselected acoustical spectrum for spatially modulating said light beam whereby atmospheric turbulence effects are predictably simulated.

4,930,353

SEMICONDUCTOR PRESSURE SENSOR

Yukihiro Kato; Eishi Kawasaki, both of Kariya, and Masahito Mizukoshi, Nagoya, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Jul. 31, 1989, Ser. No. 388,022
Claims priority, application Japan, Aug. 7, 1988, 63-197572; Jun. 21, 1989, 1-158715
Int. Cl.[5] G01L 7/08, 9/06
U.S. Cl. 73—727 19 Claims



1. A semiconductor pressure sensor adapted to detect a pressure of a measured medium, which comprising in combination;

a sensing portion composed of a glass support plate and a silicon substrate disposed thereon and provided with a diaphragm portion displaceable in accordance to a pressure of a measured medium at such a position of the silicon substrate as to be brought into contact with said measured medium;

a detecting means disposed within said sensing portion so as to detect a displacement of said diaphragm portion;

a housing having an interior space including an accommodation portion for accommodating said sensing portion and having at least a predetermined portion of said accommodation portion made up of metal as opposed to said sensing portion; and

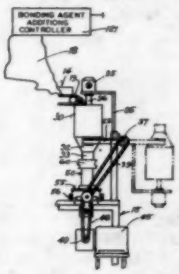
a solder glass provided between said predetermined portion of said housing and a predetermined portion of said sensing portion so as to hermetically seal the interior space of said housing with respect to said measured medium.

4,930,354

AUTOMATIC BOND DETERMINATOR

Leslie C. Knopp, Neenah, and Kenneth M. Baumgartle, Appleton, both of Wis., assignors to Hartley Controls Corporation, Neenah, Wis.

Filed Mar. 6, 1989, Ser. No. 318,862
Int. Cl.[5] G01N 11/00
U.S. Cl. 73—823 4 Claims



1. An automatic bond determinator for measuring the amount of bonding agent in a sample of foundry green sand having mounting means on which is mounted a delivery structure and two testing structures comprising:

a riddle mounted on said delivery structure;

said riddle including a screen positioned to sift foundry green sand;

a specimen tube having a first position below said riddle to receive sifted foundry green sand;

said tube having a vertically movable bottom;

means for raising and lowering said bottom of said specimen tube to eject foundry green sand from said tube;

means for leveling foundry green said within said specimen tube;

means for traversing said specimen tube to a second position at the first said testing structure and then to a third position at the second said testing structure;

said first testing structure including a compacting plunger and means for moving said plunger in and out of said specimen tube only while mounted on said first testing structure in said second position such that said foundry green sand within said specimen can be uniformly compressed at a specific pressure by said plunger;

means for measuring and recording said compresaion of said foundry green sand in said specimen tube;

said first testing structure also including means for measuring and recording the moisture content of said foundry green sand in said specimen tube;

after compression said foundry green sand being a compacted specimen;

said second testing structure including a green compressive strength plunger and means for moving said plunger up

and down onto said compacted specimen only while mounted on said second testing structure in said third position such that a predetermined amount of said compacted specimen is extruded from the specimen tube by said raising and lowering means and said extruded compacted specimen is pressed by said green compressive strength plunger until said compacted specimen fractures;

means for measuring and recording the pressure exerted by the green compressive strength plunger at moment said compacted specimen fractures;

means for automatically adding water and other additives to the foundry green said system from which said sample of foundry green sand in said specimen tube came;

means for transferring said measurements and recordings to a means for processing and analyzing each said measurement made at each said testing structure;

said means for processing and analyzing being capable of determining if said means for automatically changing the quantity of water and other ingredients should be engaged;

whereby the amount of bonding agent in the sample is determined and if more or less bonding agent is required, the proper amount is added to the foundry green sand system to maintain a desired level.

4,930,355

HYDRAULIC DRIVE APPARATUS AND METHOD FOR INSTRUMENTED PENETRATION AND TENSILE-IMPACT TESTING

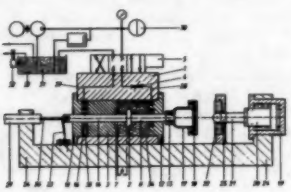
Siegfried Heck, Sindelfingen, Fed. Rep. of Germany, assignor to Roboflex Ltd., Switzerland

Filed Jan. 30, 1989, Ser. No. 305,895

Claims priority, application Fed. Rep. of Germany, Jan. 28, 1988, 3802500

Int. Cl.[5] G01N *3/00*

U.S. Cl. 73—840 **31 Claims**



23. A method for performing a load test on a sample element that is mounted stationarily to receive a force from a piston rod movable by a force conveyed thereto by a light operational piston mounted coaxially thereon when the operational piston experiences a force by an impact therewith by a hydraulically driven heavier lead-in piston that has a diameter larger than a diameter of the operational piston and is disposed to controllably slide coaxially with respect to the operational piston and the piston rod in a hydraulic chamber, comprising the steps of:

providing a controlled flow of a hydraulic oil to said hydraulic chamber, to thereby accelerate said lead-in piston over a predetermined short distance toward said operational piston to deliver a predetermined amount of energy upon impact therewith with minimal recoil; and

determining an actual load experienced by said sample element and a related deformation thereof.

4,930,356

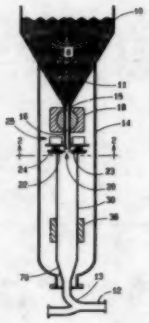
FLOWMETER FOR GAS-ENTRAINED SOLIDS FLOW

Karl G. Porges, Evanston, Ill., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Apr. 20, 1989, Ser. No. 341,004

Int. Cl.[5] G01F *1/56*

U.S. Cl. 73—861.08 **15 Claims**



1. A flowmeter for measurement of solids feedrate in a gas-entrained solids flow conveyance system comprising:

a vertical duct connected at the top end to a source of solids for gas-entrainment and connected at the bottom end to a gas-entrained flow conveyance system,

a control valve positioned in said vertical duct capable of restricting the flow of solids so that below said control valve, the solids fall by force of gravity, and

a capacitive densitometer positioned on said duct at a location a known distance below said control valve,

whereby the solid feedrate, Q, of a gas entrained flow can be determined by

$$Q = S\rho\phi v_s$$

where S is the cross sectional area of said duct, ρ is the density of the solid, ϕ is the solid volume fraction determined by said capacitive densitometer, and v_S is the local solid velocity which can be inferred from the known distance of said capacitive densitometer below said control valve.

4,930,357

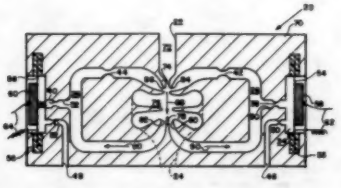
FLUIDIC VOLUMETRIC FLUID FLOW METER

John F. Thurston, and Alan L. Golembiewski, both of Mesa, Ariz., assignors to Allied-Signal Inc., Morris Township, N.J.

Filed Nov. 21, 1986, Ser. No. 933,648

Int. Cl.[5] G01F *1/20*

U.S. Cl. 73—861.19 **48 Claims**



30. Apparatus for measuring liquid volume flow rate comprising: fluidic oscillator means having power nozzle means for receiving a flow of liquid and forming said flow into a liquid

jet, means for using said liquid jet to create in a channel having a fluidic inductance, a pulsating pressure signal whose frequency is indicative of liquid volume flow rate through said power nozzle, means communicating with said channel and said pulsating pressure signal therein and having a fluidic capacitance for producing an output signal in response to said pulsating pressure signal, and means for inhibiting undesirable dynamic interaction (ringing) of said fluidic inductance of said channel with said fluidic capacitance of said output signal producing means.

4,930,358

METHOD OF AND APPARATUS FOR MEASURING FLOW VELOCITY BY USING ULTRASONIC WAVES

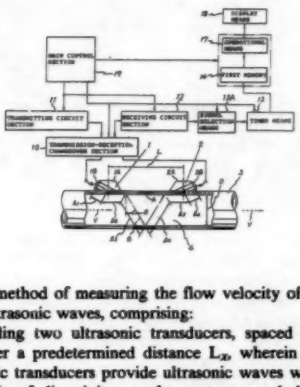
Ryohei Motegi; Shinichi Takeuchi, and Toshio Sato, all of Tokyo, Japan, assignors to Tokyo Keiki Co., Ltd., Tokyo, Japan

Filed Mar. 21, 1988, Ser. No. 171,257

Claims priority, application Japan, Mar. 27, 1987, 62-73389; Jun. 3, 1987, 62-139398

Int. Cl.[5] G01F *1/66*

U.S. Cl. 73—861.28 6 Claims



1. A method of measuring the flow velocity of a fluid by using ultrasonic waves, comprising:

providing two ultrasonic transducers, spaced from each other a predetermined distance L_x, wherein said ultrasonic transducers provide ultrasonic waves with a small angle of directivity on the upstream and downstream sides, respectively, of a piping;

causing the ultrasonic waves to alternately and obliquely enter into said piping through the outer wall thereof so as to measure sound velocities C_1 of wedge portions in said ultrasonic transducers at the time of measurement; and

propagating the ultrasonic waves from the upstream side to the downstream side and from the downstream side to the upstream side at approximately the time of said measurements so that the propagation times t_d and t_u, which represent propagation times of the ultrasonic waves through the wall of the piping and the fluid in said piping, are measured in sequence, and said measured values C_1, t_d, t_u and the distance L_x between said ultrasonic transducers are substituted into a function, $V=F(C_1,t_u,t_d,L_x)$, which is calculated by use of known constants, to thereby specify the flow velocity of the fluid in said piping.

4,930,359

APPARATUS FOR PRPARING SAMPLES FROM A FLOW OF BULK MATERIAL

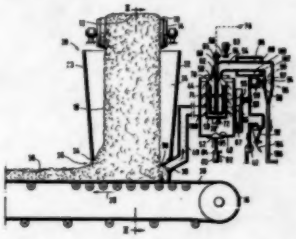
Erhard Wolfrum, Düren-Birgel; Wolfgang Faber, Kerpen/Sindorf; Reiner König, Fliederweg 14, 6236 Eschborn 2, and Rolf A. Sieglen, Im Hohlweg 8a, 6231 Sulzbach/Taunus, all of Fed. Rep. of Germany, assignors to Rheinische Braunkohlenwerke AG; Reiner König and Rolf A. Sieglen, all of, Fed. Rep. of Germany

Filed Mar. 1, 1989, Ser. No. 317,319

Claims priority, application Fed. Rep. of Germany, Mar. 2, 1988, 3806677

Int. Cl.[5] G01N *1/00*

U.S. Cl. 73—863.23 11 Claims



1. Apparatus for preparing samples from a flow of bulk material for the purpose of determining at least one representative characteristic of the sampled material which is taken in the form of a mix of fine and coarser particles of dust from said flow of bulk material by way of a suction conduit having an intake opening, the apparatus being positioned in use thereof at a spacing from the intake opening of the suction conduit and at a spacing from the flow of bulk material and comprising a grading means for separating from the dust mix the grain fraction required for performing a representative analysis operation, the grading means including a first housing for accommodating first hollow filter means, the first housing having an intake opening for introducing the dust mix into the first housing outside the first filter means, a second housing disposed downstream of the first housing, for accommodating second hollow filter means, conduit means communicating the interior of the first filter means with the interior of the second filter means, reduced pressure-generating means communicating with the second housing outside the second filter means, the internal cross-sectional area of each housing being larger than the cross-sectional area of the respectively associated filter means, said cross-sectional areas being measured in the same plane transverse to the longitudinal axes of the respective housing and filter means, the first filter means determining the upper separation cut-off limit of the grain fraction required for carrying out the analysis operation, and the second filter means determining the lower separation cut-off limit of said grain fraction.

4,930,360

LIQUIDS SAMPLER

Samantha S. H. Tan, Fremont, Calif., assignor to Balazs Analytical Laboratory, Sunnyvale, Calif.

Filed Jul. 21, 1989, Ser. No. 383,924

Int. Cl.[5] G01N *1/14*

U.S. Cl. 73—864.34 8 Claims

1. An apparatus for removing a sample of a liquid for chemical analysis from a vessel containing said liquid and for delivering said sample into a sample bottle, comprising:

a hollow member having a wall structure defining an enclosed plenum;

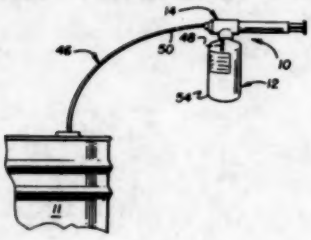
a sample bottle attachment structure defining a passage having a first end portion communicating with said ple-

num and a second end portion adapted for attachment to a top portion of said sample bottle;

hand pumping means for manually creating a partial vacuum in said plenum;

a longitudinally extending sample transport tube having a first end portion, a central portion and a second end portion, said first end portion of said tube extending through said passage into said bottle, said central portion passing through said wall structure in substantially air tight relation thereto and said second end portion of said tube being adapted for positioning in said liquid in said vessel; and

a partition across said passage supporting said first end portion of said transport tube.



4,930,361

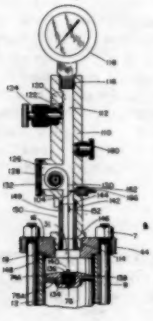
PORTABLE PISTON STYLE SAMPLE CYLINDER

Spencer M. Nimberger, Houston, Tex., assignor to Precision General, Inc., Houston, Tex.

Division of Ser. No. 291,755, Dec. 29, 1988, Pat. No. 4,862,754. This application Aug. 18, 1989, Ser. No. 395,883

Int. Cl.[5] G01N *1/12*

U.S. Cl. 73—864.62 **10 Claims**



1. A portable sampler for collecting and transporting a fluid sample, including a cylindrical tube having a uniform inner diameter and defining a sampler axis, a sample end cap at one end of the tube and a charge end cap at the other end of the tube, a piston having a sample facing surface and a charge facing surface and slidable within the tube for defining a sample chamber between the sample end cap and the piston, and a charge chamber between the charge end cap and the piston, a sample input port in the sample end cap for introducing the fluid sample to the sample chamber, and a charge port in the charge end cap for inputting and releasing gas from the charge chamber, the sampler further comprising:

a housing secured to the charge end cap and having a passageway in fluid communication with the charge chamber via the charge port;

a coiled tape mounted to the housing and having one end extending through the charge end cap and secured to the piston; and

detection means for determining the position of the tape relative to the housing and thus the axial position of the piston within the tube.

4,930,362

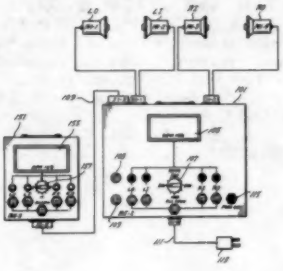
WHEEL SPIN-UP TESTER

Cortland L. Griffin, Santa Ana, Calif., assignor to McDonnell Douglas Corporation, Long Beach, Calif.

Filed Jun. 5, 1989, Ser. No. 361,485

Int. Cl.[5] G01M *19/00*

U.S. Cl. 73—865.3 **4 Claims**



1. A transducer tester system comprising:

a power supply;

a first rheostat, electrically connected to said power supply for controlling the electrical energy supplied by said power supply;

at least one central control switch electrically connected to said rheostat;

at least one drive motor, electrically connected to said at least one control switch, adapted to drive a transducer;

at least one central indicator lamp, also electrically connected to each said control switch, to indicate activation of its associated drive motor;

a central relay actuator electromagnetically linked to each said control switch; and,

a central speed indicator electrically connected to said at least one drive motor.

4,930,363

METHOD OF DETERMINING ATTRACTANT PREFERENCE OF FISH

Keith A. Jones, Spirit Lake, Iowa, assignor to Berkley, Inc., Spirit Lake, Iowa

Filed May 26, 1989, Ser. No. 358,008

Int. Cl.[5] G01B *1/00*

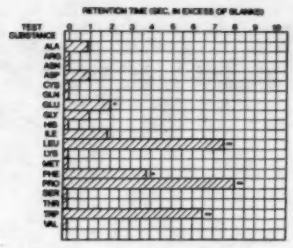
U.S. Cl. 73—865.7 **11 Claims**

1. A method for determining palatability of a stimulant or attractant to a fish species comprising the steps of:

(a) providing a feeding substrate of a chemically inert, fibrous material, digestible by said fish species;

(b) applying to said substrate a material of interest as a potential attractant or stimulant to said fish species;

(c) exposing a member of said fish species to said substrate containing said material of interest; and



(d) measuring the length of time in seconds said substrate containing said material of interest is retained by said member of said fish species.

4,930,364

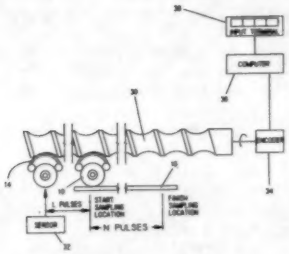
GLASS CONTAINER INSPECTING MACHINE

Russ J. Baker, Horseheads, and Robert A. Hansen, Elmira, both of N.Y., assignors to Emhart Industries, Inc., Indianapolis, Ind.

Filed Oct. 5, 1988, Ser. No. 253,833

Int. Cl.[5] G01M *19/00*

U.S. Cl. 73—865.8 **3 Claims**



1. A glass container inspection machine for inspecting the wall thickness of a round bottle having vertical seams comprising:

a test station for generating a continuous voltage signal representative of the thickness of a portion of the round bottle located at the test station,

mechanical handling means for displacing a portion of the wall of a round bottle past said test station,

encoding means for issuing pulses relative to surface displacement as said container passes through said test station,

means for sampling the voltage signal whenever said encoding means issues a pulse during a predetermined sampling period,

means for detecting the presence of a wall seam at said test station,

means for ignoring the sampled voltage for a first selected number of pulses prior to the detection of a seam, and

means for ignoring the sampled voltage for a second selected number of pulses following the detection of the seam.

4,930,365

TWO AXIS RATE GYROSCOPE

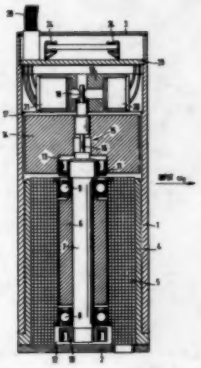
Itzhak Porat, 4, Caspary Street, Haifa 34 673; Jehuda Rosenberg, 67, Habonim Street, Kiryat Tivon 36 000; Ehud Netzer, P.O. Box 87, Timrat Migdal Haemek Post, 10505, and Yishai Netzer, Yuvalim 112, Gush-Segev 20 142, all of Israel

Continuation-in-part of Ser. No. 96,396, Sep. 11, 1987, abandoned. This application Sep. 16, 1988, Ser. No. 247,083

Claims priority, application Israel, Jan. 9, 1987, 81215

Int. Cl.[5] G01C *19/28, 19/22*

U.S. Cl. 74—5.6 A **10 Claims**



1. A two axis rate gyroscope of the kind comprising an electric motor driven inertia rotor that is distinct from the motor rotor, which inertia rotor is keyed on the electric motor shaft, the improvement by which the portion of the motor shaft on which the inertia rotor is keyed comprises a flexible part constituting a flexure shaft adapted to flex upon precession of the inertia rotor in consequence of an angular velocity input around either of two axes normal to each other and both normal to the rotor spin axis; the shaft comprises an end portion extending beyond the inertia rotor in a direction away from the electric motor and constituting a deflector; non-contacting measuring means being provided in association with said deflector for detecting any deflection thereof.

4,930,366

ELECTRICAL TRANSMISSION CONTROL MECHANISM

Val G. Boucher, Roanoke; Weldon L. Phelps, Dunlap, and Daniel R. Ekstrand, Pekin, all of Ill., assignors to Caterpillar Inc., Peoria, Ill.

Filed Jul. 18, 1988, Ser. No. 220,865

Int. Cl.[5] F16H *3/08*; B60K *20/00*

U.S. Cl. 74—365 **17 Claims**

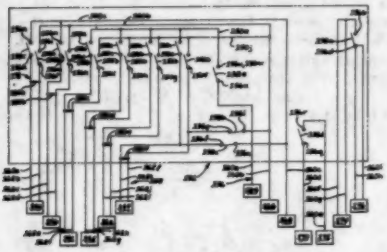
1. An electrical transmission control mechanism for shifting a transmission by controllably actuating a plurality of clutch actuating solenoids individually having a supply side lead and a ground side lead, comprising:

a control assembly;

a support assembly for pivotally supporting the control assembly for movement about a central axis; and

electrical means for ensuring that a single system electrical fault does not cause unexpected shifting of the transmission and for controllably disconnecting both the supply and ground side leads of at least one of said solenoids,

connecting both the supply and ground side leads of at least one other of said solenoids in response to movement



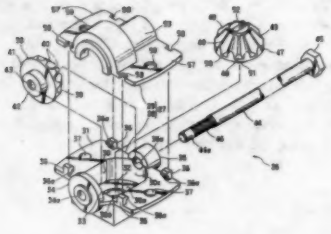
of the control assembly about the central axis, and shifting at least one of the speed and direction of the transmission.

4,930,367

PERPENDICULARLY INTERSECTING GEAR DEVICE

Hidehiko Nagasawa, Shimizu, Japan, assignor to Kolto Seisakusho Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 176,019, Mar. 31, 1988, abandoned. This application Jul. 5, 1989, Ser. No. 376,198
Claims priority, application Japan, Apr. 2, 1987, 62-50553[U]
Int. Cl.[5] F16H *1/08*
U.S. Cl. 74—416 8 Claims



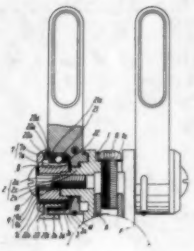
1. A perpendicularly intesection gear device comprising a first bevel gear, a second bevel gear for meshing with the first bevel gear, a housing comprising mutually mating first and second portions defining respective gear receiving spaces therein, a drive shaft extending through and being secured to the first bevel gear, the first portion of the housing having a pair of first bearing portions formed integrally therewith as a continuation of the material of said first portion for rotatably supporting the drive shaft, the first bearing portions being disposed on opposing sides of the gear receiving space and of the first bevel gear and being adapted for rotatably supporting the drive shaft at a tip end thereof and at a position on the opposite side of said first bevel gear from said tip end, respectively, and the second bevel gear being disposed in the gear receiving space of the first portion of the housing so as to be rotatably and axially stationarily supported therein in mesh with the first bevel gear; the first and second housing portions having cooperating flanges for securing the first housing portion to the second housing portion, the flanges defining a plane which includes the axis of the drive shaft.

4,930,368

SPEED CHANGE OPERATING DEVICE FOR A BICYCLE

Masashi Nagano, Izumi, Japan, assignor to Shimano Industrial Company Limited, Osaka, Japan

Division of Ser. No. 79,465, Jul. 30, 1987, Pat. No. 4,815,330, which is a division of Ser. No. 665,941, Oct. 29, 1984, Pat. No. 4,751,850. This application Oct. 18, 1988, Ser. No. 259,145
Claims priority, application Japan, Apr. 3, 1984, 59-67162; Apr. 3, 1984, 59-67163; Jul. 25, 1984, 59-156222
Int. Cl.[5] G05G *9/00*
U.S. Cl. 74—475 8 Claims



1. A speed-change operating device adapted to switch a derailleur from one to another of plural speed stages of a bicycle, said derailleur having a return spring for returning the derailleur to a rest position, said speed-change operating device comprising:

a base member adapted to be supported on said bicycle, said base member having a lever shaft,

an operating lever rotatably supported on said lever shaft and adapted to actuate said derailleur,

a friction mechanism for applying to said lever a rotational resistance adapted to overcome a bias supplied by said return spring of said derailleur,

a positioning mechanism for positioning said lever at one of said plural speed change stages, said positioning mechanism including a positioning member having a plurality of engaging portions oriented substantially on a circle centered around said lever shaft and an engaging member engageable with at least one of said engaging portions, and

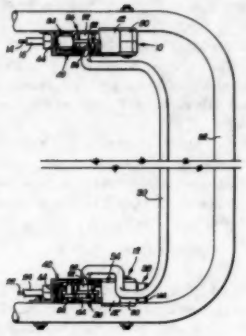
an operating mechanism to select between an operating mode and a non-operating mode for said positioning mechanism for positioning said lever, said operating mode being a mode in which said engaging member and said engaging portions are positioned at a first position relative to one another such that rotation of said operating lever causes said engaging member to selectively engage with at least one of said engaging portions to enable said operating lever to be positioned at one of said plural speed change stages, and said non-operating mode being a mode in which said engaging member and said engaging portions are positioned at a second position relative to one another such that said engaging member is prevented from engaging with any of said engaging portions, wherein said operating mechanism comprises an operating member for moving between an operating mode position such that said positioning member and said engaging member are at said first position relative to one another and a non-operating mode position such that said positioning member and said engaging member are at said second position relative to one another.

4,930,369

RADIAL GROUND DRIVE AND BLADE CLUTCH CONTROL FOR LAWNMOWER

Michael A. Barnard, and Anthony F. Beugelsdyk, both of Wichita, Kans., assignors to Wescon Products Company, Wichita, Kans.

Division of Ser. No. 71,470, Jul. 9, 1987, Pat. No. 4,850,182. This application Feb. 13, 1989, Ser. No. 309,256
Int. Cl.[5] G05G 9/08; A01D 69/00
U.S. Cl. 74—480 R 3 Claims



1. A cable control system for a lawnmower or the like and adapted for connection to the respective ends of first and second operating cables, each of the cables being shiftable between first and second positions and being biased toward the first positions, said system comprising:

a first cable control device having a first shiftable operating handle including means for connecting with the first cable end for selectively shifting the first cable between the first and second positions in response to shifting of said first operating handle between corresponding first and second positions, the first cable, when connected to said first operating handle, correspondingly biasing said first operating handle toward said first position;

a second cable control device having a second shiftable operating handle including means for connecting with the second cable end and for selectively shifting the second cable between the first and second positions in response to shifting of said second operating handle between corresponding first and second positions, the second cable, when connected with said second operating handle, correspondingly biasing said second operating handle toward said first position;

a deadman handle having an operating position and being shiftable toward and away from said operating position;

means operatively coupling said devices with said deadman handle,

said first device including means for holding said first handle in said second position when said deadman handle is in said operating position and for releasing said first handle in order to allow said first handle to shift from said second position to said first position when said deadman handle shifts a first predetermined distance away from said operating position,

said second device including means for holding said second handle in said second position when said deadman handle is in said operating position and for releasing said second handle in order to allow said second handle to shift from said second position to said first position when said deadman handle shifts a second predetermined distance, different from said first predetermined distance, away from said operating position.

4,930,370

MIRROR DRIVE FOR AUTOMOTIVE REMOTE-CONTROLLED REAR-VIEW MIRROR ASSEMBLY

Norio Yoshida, Isehara, Japan, assignor to Ichikoh Industries, Ltd., Tokyo, Japan

PCT No. PCT/JP88/00812, § 371 Date May 25, 1989, § 102(e) Date May 25, 1989, PCT Pub. No. WO89/01426, PCT Pub. Date Feb. 23, 1989
PCT Filed Aug. 17, 1988, Ser. No. 345,704
Claims priority, application Japan, Aug. 18, 1987, 62-124813
Int. Cl.[5] F16C 1/10; B60R 1/06; G02B 7/18
U.S. Cl. 74—502.1 6 Claims

1. A mirror drive for use in a remote-controlled rear-view mirror assembly, comprising:

two motors to drive the horizontal and vertical turns of a mirror pivotably supported in a mirror housing;

an airtight container housing said two motors and consisting of two synthetic resin-made casings which are closely attached to each other;

gear means disposed in said airtight container and which decelerate the rotation of the output shafts of said two motors;

means engaged with said gear means to convert the rotary motion of the gear means into a substantial linear motion and also projected out of said airtight container to transmit said linear motion to said mirror; and

means for electrically connecting terminals of said two motors to external connectors outside said airtight container,

said electrical connecting means being composed of an insulative block secured to the lateral wall of either of said casings of said airtight container and which covers an opening formed in the lateral wall, and a plurality of electrically conductive plates previously buried in said insulative block, each being at one end thereof electrically connected to a corresponding terminal of said two motors while the other end is led out through said opening formed in said casing.

4,930,371

APPARATUS FOR LOCKING A FLYWHEEL

William J. Schneider, Rte. 1, Box 339, E. Bernstadt, Ky. 40729

Filed Dec. 1, 1988, Ser. No. 278,379
Int. Cl.[5] G05G 5/06
U.S. Cl. 74—527 7 Claims

6. A locking apparatus for locking a flywheel in a fixed position having a timing mark located thereon and contained within a crankcase having a threaded bore, comprising:

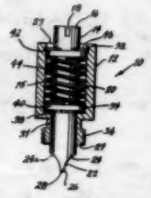
(a) a hollow body portion having a first end with a first internal diameter, an internal annular groove, a second end with a smaller second internal diameter, a shoulder portion at the juncture of said first and second diameters and the surface of said second diameter being externally threaded;

(b) a shaft positioned within said body portion having a flat first end containing a diagonal slot, an annular groove having a retainer clip that contacts said body portion

shoulder portion, a second end that terminates into a flat diagonal surface;

(c) a first annular spacer placed on said shaft, adjacent said retainer clip;

(d) a helical spring placed on said shaft, adjacent said first annular spacer;



(e) a second annular spacer placed on said shaft, adjacent said spring; and

(f) a snap ring placed in said internal annual groove, adjacent said second annular spacer and thereby retaining said spring under tension within said body portion.

4,930,372

SYSTEM FOR ENGAGING LOCK-UP CLUTCH AT HIGHEST SPEED RATIOS OF DIFFERENT OPERATION RANGES

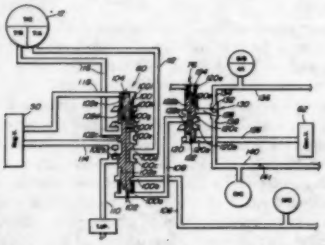
Kazuhiko Sugano, Yokohama, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Oct. 31, 1988, Ser. No. 264,850

Claims priority, application Japan, Oct. 30, 1987, 62-273213

Int. Cl.[5] F16H *47/00*

U.S. Cl. 475—65 **5 Claims**



1. In a vehicle:

a torque converter including a lock-up clutch;

an automatic transmission following said torque converter, said automatic transmission being shiftable between a plurality of speed ratios including a n th speed ratio and a n−1th speed ratio, where: n is an integer, said automatic transmission including a first friction device which is subject to a first hydraulic pressure during operation with the nth speed ratio when a first predetermined operation range is selected, a second friction device which is subject to a second hydraulic pressure during operation with the n−1th speed ratio when a second predetermined operation range is selected, and a third friction device which is subject to a third hydraulic pressure during operation with each of the nth speed ratio and the n−1th speed ratio when either one of the first or second predetermined operation range is selected;

a shuttle valve having a first inlet port subject to the first hydraulic pressure, a second inlet port subject to the second hydraulic pressure, and an outlet port, said shuttle valve including means for delivering as an output hydraulic pressure the first hydraulic pressure when said first inlet port is subject to the first hydraulic pressure and the second hydraulic pressure when said second inlet port is subject to the second hydraulic pressure;

a lock-up control valve including a spool movable between a first position where the lock-up clutch is released, and a second position where the lock-up clutch is engaged, said lock-up control valve including means for biasing said spool toward said first position, said spool having a first pressure acting area, and a second pressure acting area;

means for transmitting the third hydraulic pressure to said lock-up control valve to have the third hydraulic pressure to act on said first pressure acting area of said spool in such a direction as to urge said spool against said biasing means; and

means for transmitting the output hydraulic pressure to said lock-up control valve to have the output hydraulic pressure to act on said second pressure acting area of said spool in such a direction as to urge said spool against said biasing means,

said biasing means being so constructed and arranged as to allow movement of said spool to said second position when the third hydraulic pressure acts on said first pressure acting area and the output hydraulic pressure acts on said second pressure acting area.

4,930,373

BRAKE SYSTEM FOR AUTOMATIC TRANSMISSION

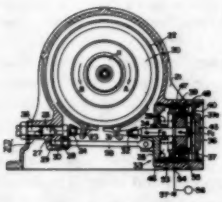
Yasunori Nakawaki, Susono; Fumihiro Ushijima, Okazaki; Akio Numazawa, Nagoya, and Toshiyuki Asada, Susono, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Japan

Filed Oct. 17, 1988, Ser. No. 258,770

Claims priority, application Japan, Dec. 4, 1987, 62-306951; Dec. 11, 1987, 62-313565; Dec. 11, 1987, 62-313566; Mar. 23, 1988, 63-69125; Apr. 21, 1988, 63-99182

Int. Cl.[5] F16H *3/44;* **F16D** *51/00;* **F01B** *7/20, 7/00*

U.S. Cl. 475—128 **29 Claims**



1. A brake system for use with an automatic transmission for braking a rotatable member accommodated in a casing, by bringing a brake band having two ends into contact with an outer circumference of said rotatable member, comprising:

a cylinder tube so held in a predetermined position in said casing as to move forward and backward in a tangential direction of said rotatable member;

a piston fitted in said cylinder tube;

a piston rod united with said piston and projecting from said cylinder tube such that it is connected to one end of said brake band;

an anchor rod so held in a predetermined position in said casing as to move forward and backward in the tangential direction of said rotatable member and connected to the other end of said brake band;

a connecting member for connecting said cylinder tube and said anchor rod so that they may move together forward and backward; and

a valve mechanism disposed in said cylinder tube and adapted to be opened, when said cylinder tube is moved by a force received in a predetermined direction from said brake band through said piston rod to either apply a fluid pressure in a direction to reduce a fastening force by said brake band or release said fluid pressure.

4,930,374

PROCESS FOR THE GEAR CHANGE OF AUTOMATIC OR SYNCHRONIZED MECHANIC TRANSMISSION OF MOTOR VEHICLES

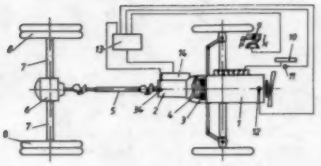
Sándor Simonyi, Salgótarján; László Törőcsik, Budapest, and György Válóczi, Salgótarján, all of Hungary, assignors to Csepel Autógyár, Szigetszentmiklós, Hungary

Filed Oct. 3, 1988, Ser. No. 252,654

Claims priority, application Hungary, Oct. 14, 1987, 2251-4627/87

Int. Cl.[5] B60K 41/06

U.S. Cl. 74—866 6 Claims



1. The process of controlling gear change in a vehicle having an engine and a transmission capable of automated shifting of gears, which comprises

(a) establishing a first functional relationship between the torque available from the vehicle engine for various throttle positions and a second functional relationship between the torque available from the vehicle engine for various r.p.m. speeds thereof,

(b) deriving a throttle signal representative of the throttle position of said vehicle,

(c) comparing said throttle signal with said first functional relationship and generating a throttle/torque signal representing the available torque for said throttle position,

(d) deriving an r.p.m. signal representative of the r.p.m. of the vehicle engine,

(e) comparing said r.p.m. signal with said second functional relationship and generating an r.p.m./torque signal representing the available torque for said r.p.m. value,

(f) comparing said throttle/torque and said r.p.m./torque signal to determine relative loading of said engine and to derive a loading signal representative of said loading,

(g) continuously comparing said loading signal to first predetermined upshift and downshift comparative load level values,

(h) continuously comparing said r.p.m. signal to first predetermined upshift and downshift comparative r.p.m. level values,

(i) in response to a combination of (1) said loading signal being below the first predetermined upshift load level value and (2) said r.p.m. signal being above the first predetermined upshift r.p.m. level value, and (3) said transmission being in a gear below the highest, effecting an upshift of said transmission, and

(j) in response to either (1) said loading signal exceeding the first predetermined downshift load level value or (2) said r.p.m. signal being below the first predetermined downshift r.p.m. level value, in combination with said transmission being in a gear above the lowest, effecting a downshift of said transmission.

4,930,375

HYDRAULIC CONTROL SYSTEM FOR AUTOMATIC TRANSMISSION

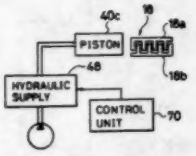
Koichi Yamamoto, and Takahiro Kyohzuka, both of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Dec. 28, 1988, Ser. No. 291,271

Claims priority, application Japan, Dec. 28, 1987, 62-332189; Jan. 19, 1988, 63-9004

Int. Cl.[5] B60K 41/18

U.S. Cl. 74—866 15 Claims



1. A hydraulic control system for an automatic transmission comprising

a multiple gear mechanism having a plurality of shift gear stages and at least one of frictional means provided with piston means and a pair of frictional members controlled to be moved between an engaged position in which the frictional members are frictionally engaged with each other and a disengaged position in which the frictional members are disengaged from each other by virtue of a hydraulic pressure applied to the piston means so as to switch a power transmitting path in the automatic transmission for accomplishing a gear shift operation among the plurality of the shift gear stages,

the improvement comprising

a hydraulic supply means for applying the hydraulic pressure to the piston means,

restricting means for carrying out a restriction control in which the hydraulic pressure applied to the piston means is maintained at a substantially constant value for a predetermined period at an initial stage of the gear shift operation wherein the frictional members are being moved to the engaged position and producing an initial engaging force therebetween.

4,930,376

MINIMIZING DELAY IN LOW TEMPERATURE ENGAGEMENT OF AUTOMATIC TRANSMISSION CLUTCH OR BRAKE

Joseph S. Van Selous, Highland, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Sep. 1, 1988, Ser. No. 239,379

Int. Cl.[5] B60K 41/04

U.S. Cl. 74—867 19 Claims

1. A system for supplying hydraulic fluid to a friction element of an automatic transmission, comprising:

a first source of fluid pressure;

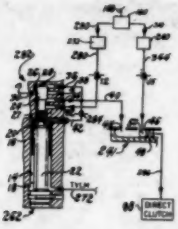
a second source of fluid pressure;

a vent port;

valve means for regulating output of the second pressure source and producing regulated output pressure, including feedback control pressure connected to regulated output pressure, a spool having a control pressure surface connected to feedback control pressure and biased by feedback control pressure to a first position where the second pressure source is closed to regulated output pressure, a spring biasing the spool to a second position where the second pressure source is open to regulated output pressure;

shuttle valve means having states for opening communication between two members of a group comprising regu-

lated output pressure, the first pressure source and the friction element, and closing communication between mutually communicating members of said group and the other member of said group; and



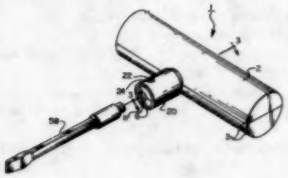
means for preventing communication between the vent port and regulated output pressure regardless of the state of the shuttle valve means.

4,930,377

TIRE REPAIR KIT

Mark Lester, 20 Skimhampton Rd., Easthampton, N.Y. 11937

Filed Feb. 15, 1989, Ser. No. 311,706
Int. Cl.[5] B60C *25/16*
U.S. Cl. 81—15.2 20 Claims



1. A tire repair device for inserting a plug strand material into a tire puncture comprised of:

a handle member, said handle member being comprised of two handle portions, which portions when joined together to form an enclosed, internal space within said handle, wherein a tool, plug material and the like may be stored and maintained;

a tool; and

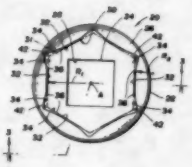
means for interchangeably joining said tool to said handle, wherein said tool joining means is comprised of a tool receiving flange which extends from said handle member, a portion of said flange being formed in each of said handle portions, said flange further defining a longitudinal bore therethrough said bore having a first smaller diameter at the terminal ends thereof and a second larger diameter along an internal portion thereof.

4,930,378

WRENCH OPENING ENGAGEMENT SURFACE CONFIGURATION

David S. Colvin, Farmington Hills, Mich., assignor to David S. Colvin, Farmington Hills, Mich.

Continuation of Ser. No. 185,042, Apr. 22, 1988. This application Dec. 6, 1989, Ser. No. 446,651
Int. Cl.[5] B25B *13/06*
U.S. Cl. 81—121.1 34 Claims



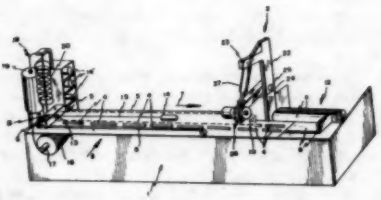
1. A wrench including a body defining a closed wrench opening that has a central axis and is of a nominal size for torquing a conventionally toleranced hexagonal fastener such as a nut or bolt head or the same nominal size, said wrench opening comprising: first six flat surfaces that extend circumferentially with respect to the opening in a generally hexagonal shape; six pairs of second flat surfaces respectively located adjacent the six circumferentially extending first flat surfaces with the second flat surfaces of each pair located adjacent opposite ends of the associated circumferentially extending first flat surface; six pairs of curved engagement surfaces respectively associated with the six circumferentially extending first flat surfaces; each pair of curved engagement surfaces connecting the associated circumfentially extending first flat surface and the pair of second flat surfaces at opposite ends thereof; each curved engagement surface having opposite ends that are respectively tangent with the circumferentially extending first flat surface and the pair of second flat surfaces connected thereby; the curved engagement surfaces engaging the conventionally toleranced hexagonal fastener without any engagement of the hexagonal fastener by the first and second flat surfaces; and connecting surfaces that connect the six pairs of second flat surfaces with each other.

4,930,379

CUTTING APPARATUS

Tauno Takaniemi, Tampere, Finland, assignor to Vendmatic Oy, Nokia, Finland

Continuation of Ser. No. 107,834, Oct. 8, 1987, Pat. No. 4,827,876. This application Aug. 15, 1988, Ser. No. 232,037
Claims priority, application Finland, Feb. 11, 1986, 860629
Int. Cl.[5] B26D *3/16*
U.S. Cl. 82—101 8 Claims



1. A tube cutting apparatus for cutting at least one tubular piece from a tubular blank by using a cutting device effecting the outer surface of the tubular blank, said apparatus comprising:

a stopping element positioned inside the tubular blank and

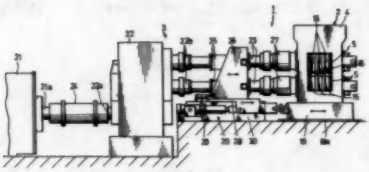
movable to a location at a cutting position of the cutting device, said stopping element being transferred and held at said cutting position inside said tubular blank by means of a flexible member which is fastened at one end to a rear end of said stopping element, in the feeding direction, and a collecting member affixed to a body construction of said cutting apparatus, said collecting member being adapted for bending said flexible member while bringing said flexible member and said stopping element from said cutting position into a stored position.

4,930,380

METHOD OF REPAIRING ROLLS OF ROLLING MILL AND ROLL CUTTING APPARATUS

Takeshi Sasaki, Chita; Yoshio Takakuwa, Ichinomiya; Takayuki Haruna, Chita, and Kiyoharu Yamada, Tohkai, all of Japan, assignors to Daidotokushuko Kabushikikaisha, Japan

Filed Jul. 22, 1988, Ser. No. 222,857
Claims priority, application Japan, Jul. 24, 1987, 62-185970
Int. Cl.[5] B21B *27/04*
U.S. Cl. 82—117 **3 Claims**



1. A roll cutting apparatus comprising:
(a) a rolling mill having a dismountable roll stand including a housing of said roll stand and rolls having a shaft and rotatably mounted on said housing,
(b) a base frame having a movable support portion for placing said roll stand with said housing thereon, said base frame further having a space for placing said roll stand therein over said support portion, said base frame including:
(c) securing means securing said housing of said roll stand on said support portion, against said base frame,
(d) roll locating means for bringing said rolls, in the axial direction of said roll, adjacent said housing and secured against said base frame for positioning said rolls against said housing,
(e) roll rotating means secured against said base frame for rotating said rolls relative to said housing, and
(f) a cutting tool secured against said base frame for cutting said rolls rotated by said roll rotating means relative to said housing.

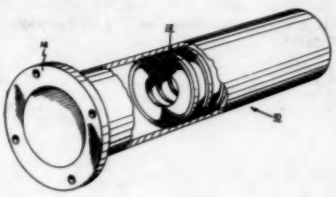
4,930,381

BAR STOCK SUPPORT

Richard C. Spooner, Guilford Rd., Durham, Conn. 06422

Continuation of Ser. No. 77,684, Jul. 24, 1987, Pat. No. 4,788,895. This application Aug. 23, 1988, Ser. No. 235,281
The portion of the term of this patent subsequent to Dec. 6, 2005, has been disclaimed.
Int. Cl.[5] B23B *39/01*
U.S. Cl. 82—163 **14 Claims**

1. A bar stock support, comprising:
(a) a tubular member;
(b) resilient means extending radially inwardly from the inner wall of said tubular member toward the major axis of said tubular member to define a generally cylindrical channel having a diameter smaller than the diameter of the smallest said bar stock to be supported, so that said resilient means is deformed substantially around the circumference of said bar stock by said bar stock; and
(c) said resilient means having sufficient resistance when deformed to continuously support said bar stock generally concentrically within said tubular member and to resist movement of said bar stock radially within said bar stock



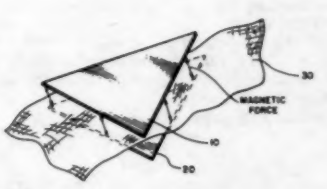
support, when said bar stock is rotating; to reduce vibration of said bar stock during the machining thereof, which vibration may lead to fracturing of said bar stock or poor quality of parts machined from said bar stock.

4,930,382

METHOD AND APPARATUS FOR CUTTING PLANAR PIECES INTO PATTERNED SHAPES

Ellen A. E. Collins, 5708 Heming Ave., Springfield, Va. 22151

Filed Feb. 8, 1989, Ser. No. 307,471
Int. Cl.[5] A41H *15/00*
U.S. Cl. 83—13 **6 Claims**



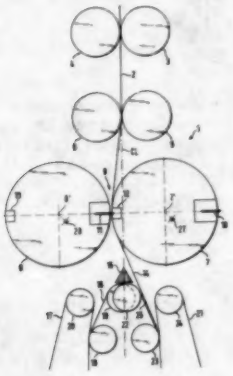
1. A method for cutting planar material pieces into particular patterns or shapes for use in the production of articles, comprising the steps of:
(a) placing a first template on one side of the planar material piece to be cut, said template shaped in a particular outline corresponding to the finished pattern or shape of the planar material;
(b) placing a second template, said second template being physically unattached to said first template, on the opposite side of the same piece of planar material, said second template shaped in the manner identical to that of said first template, whereby said second template is in congruent alignment with said first template; and
(c) cutting the planar material along the outline of said first and second templates, whereby the resulting cut material piece is shaped according to the shape of said templates.

4,930,383

COMBINATION CUTTING AND PATH SWITCHING APPARATUS FOR MOVING WEBS, PARTICULARLY PRINTED PAPER SUBSTRATES, AND METHOD

Ingo Köbler, Anhausen, Fed. Rep. of Germany, assignor to MAN Roland Druckmaschinen AG, Offenbach am Main, Fed. Rep. of Germany

Filed Jun. 15, 1988, Ser. No. 207,146
Claims priority, application Fed. Rep. of Germany, Jun. 30, 1987, 3721516
Int. Cl.[5] B26D *7/32*; B65H *29/60*
U.S. Cl. 83—27 11 Claims



1. Method of severing a moving continuous substrate web (2) into cut sheets (14, 14') and directing the cut sheets into different transport paths (16, 17; 21, 25) comprising

(a) directing a leading edge of the paper web towards a selected removal transport path (e.g. 16, 17) for gripping the leading edge of the paper web in said selected transport path;

(b) gripping the leading edge of the paper web in said selected removal transport path;

(c) then severing the paper web after the leading edge has been directed into the selected path and gripped in said selected removal transport path; and

(d) re-directing the cut edge towards the other transport path (21, 25);

(e) gripping the cut edge of the web by the other transport path (21, 25) and then cutting the web; then,

(f) directing the thus cut edge of the web to the first selected transport path; and then

(g) cyclically repeating steps (b)–(g).

4,930,384

DIE FOR NOTCHING HOLLOW TUBING

Sanji Nakatsuji, Oiso, Japan, assignor to Sanko Industries Limited, Kanagawa, Japan

Filed Feb. 23, 1989, Ser. No. 314,486
Claims priority, application Japan, Feb. 24, 1988, 63-41297
Int. Cl.[5] B26D *3/14*
U.S. Cl. 83—54 27 Claims

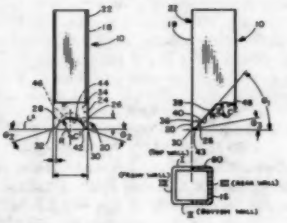
1. A die for advancement forcibly against the wall of a workpiece to make an incision therein, said die comprising:

a body having a leading end and a trailing end; and

a cutting blade on the leading end of the body, said cutting blade including:

first and second spaced projection means for forming first and second discrete incisions in a workpiece wall upon the die being forcibly advanced against the workpiece wall to a first predetermined position relative to the workpiece;

cutting edge means for severing a portion of the workpiece between the first and second discrete incisions to connect the first and second discrete incisions as the die is advanced beyond said first predetermined position relative to the workpiece;



each projection having a flat wall with the flat walls on the first and second projections being substantially coplanar; and

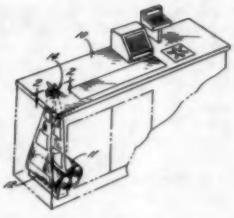
said flat walls on the projections cooperatively progressively deforming part of the workpiece wall that is cut by the die as the die is advanced.

4,930,385

DISPENSING NOZZLE FOR PLASTIC BAGS

Harry B. Wilfong, Jr., and Edwin W. Haenni, both of Hartsville, S.C., assignors to Sonoco Products Company, Hartsville, S.C.

Filed Apr. 3, 1989, Ser. No. 331,962
Int. Cl.[5] B26F *3/02*
U.S. Cl. 225—106 12 Claims



1. A dispensing nozzle adapted for serially dispensing flexible plastic bags or the like from a package of bags joined along perforated severance lines, and comprising

a plate,

at least one elongate slot extending through said plate, with said slot being configured for resisting the free movement of bags therethrough, and

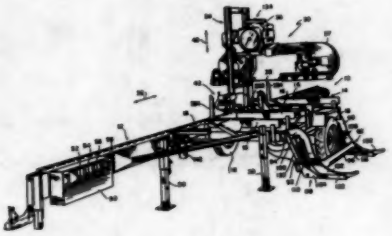
thread-up opening means extending through said plate and communicating with at least one end of said one elongate slot, said opening means including a generally circular portion of a size to permit the free end of the leading bag of a package of bags to be manually threaded therethrough and such that the bag may then be moved into said slot, and whereby the configuration of said slot resists the free movement of a bag being pulled through said slot and the resistance facilitates the severance of the pulled bag from an immediately following bag joined thereto along the severance line.

4,930,386

SAWMILL WITH HYDRAULICALLY ACTUATED COMPONENTS

Donald R. Laskowski, Indianapolis, and Daniel R. Tekulve, Batesville, both of Ind., assignors to Wood-Mizer Products, Inc., Indianapolis, Ind.

Filed Dec. 10, 1987, Ser. No. 131,121
Int. Cl.[5] B23D *55/04*; B26D *5/20*
U.S. Cl. 83—399 **35 Claims**



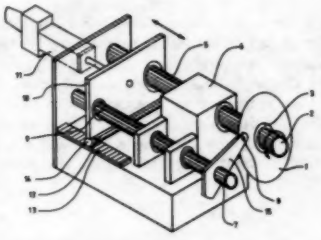
1. A sawmill comprising elongated track means, platform means for supporting a log adjacent the track means, a carriage movable longitudinally along the track means past the platform, cutting means mounted on the carriage to cut the log on the platform, means for loading the log onto the platform, said loading means including log engaging means movable toward and away from the platform, said log engaging means extending outwardly from a first side of said platform, ground engaging means for engaging the ground including a ground engaging element, said ground engaging means extending outwardly from said first side of said platform, means for driving said log engaging means toward and away from said platform, said driving means acting between said log engaging means and said ground engaging element outwardly of said first side of the platform.

4,930,387

ADJUSTABLE CIRCULAR SAW

Lauri O. Miettinen, Heinola, Finland, assignor to A. Ahlstrom Corporation, Noormarkku, Finland

Filed Jun. 20, 1989, Ser. No. 368,728
Claims priority, application Finland, Jul. 15, 1988, 883366
Int. Cl.[5] B27B *5/34*
U.S. Cl. 83—508.3 **16 Claims**



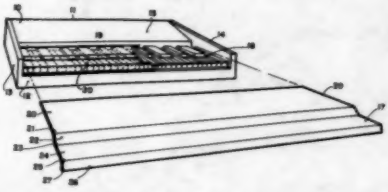
1. A circular saw comprising:
a plurality of circular saw blades;
a splined blade arbor having splines of a predetermined shape;
mounting means for mounting said blades on said splined blade arbor in side-by-side relationship with spacing therebetween so that the spacing between the blades and positions of the blades along said blade arbor are adjustable;
a plurality of saw blade guides;
at least one guide arbor on which said guides are mounted;
said guides operatively engaging said saw blades at portions thereof radially remote from said blade arbor;
a plurality of shifter bars associated with each of said blade arbor and said guide arbor, said shifter bars being slideably disposed in splines and having a shape matching the shape of the splines; and
a common actuator means connected to the shifter bars for each blade, and the guide associated therewith, so that upon movement of said actuator means there is produced simultaneous displacement of an equal amount of both the blade mounting means and the guide for a respective circular saw blade.

4,930,388

KEYBOARD PROTECTOR

Sarkis Khanzadian, 112 Glen Dr., Aptos, Calif. 95063

Continuation-in-part of Ser. No. 298,561, Jan. 17, 1989, abandoned. This application Jul. 7, 1989, Ser. No. 376,936
Int. Cl.[5] G01C *3/02*
U.S. Cl. 84—183 **16 Claims**



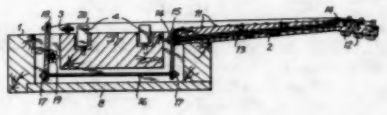
1. The combination of a detachable keyboard protector and a keyboard instrument of the type having a plurality of keys arranged horizontally and a plurality of black or upraised keys, comprising:
a rear section with a plurality of fastening means attached thereto, an intermediate section unitarily joined to the rear section at a rear laterally extending edge,
a horizontal planar central section joined to the intermediate section at an intermediate laterally extending edge,
a frontal section joined to the planar central section through a forward laterally extending edge and terminating in a frontal laterally extending edge, and
an interfacing layer of protective material permanently bonded to said keyboard protector, thereby preventing passage of dirt, dust, and other contaminants.

4,930,389

SELF-TENSIONING TRUSSROD SYSTEM

Robert M. Kunstadt, 470 West End Ave., New York, N.Y. 10024

Filed Jun. 29, 1989, Ser. No. 373,159
Int. Cl.[5] G10D *3/12*
U.S. Cl. 84—293 **7 Claims**



1. A stringed musical instrument provided with:
a neck provided with strings having first and second ends, said first ends being anchored to said neck in the region of its string nut;
means for tensioning said strings;
a trussrod internal to said neck, said trussrod having a first

and a second extremity, said first extremity being connected to said neck in the region of its string nut and secured against tensional forces exerted on said trussrod at its said second extremity; and

a tailpiece comprising a lever pivotally attached to said body and having first and second arms, said first arm anchoring said strings at their said second end, said second arm being connected to transmission means, said transmission means being connected to said second extremity of said trussrod for applying tension thereto substantially in proportion to the tension on said strings.

4,930,390

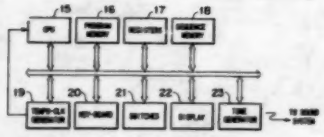
AUTOMATIC MUSICAL PERFORMANCE APPARATUS HAVING SEPARATE LEVEL DATA STORAGE

Steven L. Kellogg, and Jack A. Kellogg, both of Santa Cruz, Calif., assignors to Yamaha Corporation, Hamamatsu, Japan

Filed Jan. 19, 1989, Ser. No. 300,115

Int. Cl.[5] G10H *1/06, 1/42, 1/46, 7/00*

U.S. Cl. 84—611 **34 Claims**



23. An automatic musical performance apparatus comprising:

primary memory means for recording performance data, said primary memory means having a plurality of tracks containing pattern data, said pattern data including track data capable of having different loop length data and rhythm parameters depending on tracks, said track data being repeated with said loop length;

song data memory means for storing song data including a sequence and repetition times of said pattern data;

data read means for reading said pattern data in each track independently of the other tracks according to said song data; and

tone generating means for generating musical tones in accordance with data supplied from said data read means.

4,930,391

METHOD AND APPARATUS FOR FATIGUE AND FRACTURE TESTING OF LARGE CALIBER CANNONS

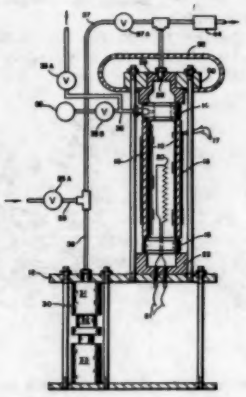
Joseph A. Kapp, 25 Elmhurst Avenue, Rensselaer, N.Y. 12144

Filed Jul. 24, 1989, Ser. No. 383,980

Int. Cl.[5] F41A *31/02*

U.S. Cl. 89—1.1 **7 Claims**

1. The method of fatigue and fracture testing a ferrous metal tube which comprises the steps of closing the ends of the tube, then filling the tube with a charge of gaseous ethylene, acetylene or a mixture thereof under superatmospheric pressure, thereafter explosively decomposing the gaseous charge in the tube, then opening the tube and relieving the gas pressure therein, repeating the cycle a predetermined number of times,



and finally examining the interior surface of the tube for fractures and for microstructural changes.

4,930,392

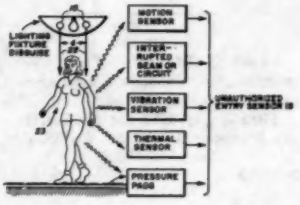
BALLISTIC STREAM ELECTRICAL STUNNING SYSTEMS

John R. Wilson, 637 Totman Ct., Patterson, Calif. 95363

Filed Jun. 15, 1989, Ser. No. 366,600

Int. Cl.[5] F41B *15/00;* **F41H** *13/00*

U.S. Cl. 89—1.11 **28 Claims**



5. In a method for automatically stunning intruders, the steps of:

automatically sensing when a subject has intruded into a certain predetermined area to be protected to produce ar intrusion output; and

applying a ballistic stream of conductive fluid into the protected area in response to the intrusion output for contacting the intruding subject and completing an electrical circuit between the intruding subject and a source of power of sufficient voltage and current to stun the intruding subject.

4,930,393

MODEL ROCKET LAUNCH SYSTEM

Walter N. Castro, Jr., 104 Lake Pines, Irvine, Calif. 92720

Filed Apr. 11, 1988, Ser. No. 180,131

Int. Cl.[5] F41F *3/04*

U.S. Cl. 89—1.814 **6 Claims**

1. A model rocket launcher for providing power to an igniter for a model rocket comprising:

an outer housing,

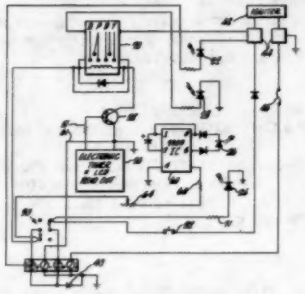
a count down timer including a display on the outer housing to indicate the time to launch,

first and second terminals on the housing for providing power to an igniter for a model rocket,

a power source for the ignition power,

a selection switch for selection between operation in an auto mode and a manual mode,

an auto mode circuit including a relay, which relay is activated by the count down timer when the timer has



counted down to zero, when selected the auto mode circuit connecting the power supply through the selection switch, through the relay to the first terminal,

a manual mode circuit including a manually operated switch, when selected the manual mode circuit connecting the power supply through the selection switch to the first terminal,

and a return circuit connecting the second terminal to the power source.

4,930,394

BARRELED WEAPON WITH CHEMICAL-ELECTRICAL HYBRID PROPULSION THROUGH REGENERATIVE PROPELLANT INJECTION

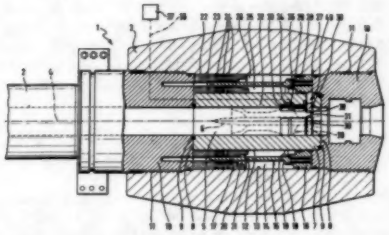
Dieter Zwingel, Simmelsdorf; Gunther Lochner, Altdorf, and Sonke Bleickert, Ruckersdorf, all of Fed. Rep. of Germany, assignors to Diehl GmbH & Co., Nuremberg, Fed. Rep. of Germany

Filed Jun. 2, 1989, Ser. No. 360,004

Claims priority, application Fed. Rep. of Germany, Jun. 16, 1988, 3820492

Int. Cl.[5] F41D *7/06*; F41F *1/00*; F42B *13/16*

U.S. Cl. 89—7 **6 Claims**



1. A barreled weapon for electrical-chemical hybrid propulsion of projectiles through the intermediary of regenerative injection of fluid propellants, comprising a housing, at least one axially movable piston, a plasma burner having an electrode arrangement for producing a electric arc discharge, and a projectile chamber, wherein propellant gases are generated by reaction of said fluid propellant components, said gases being forcibly conducted past said electrode arrangement of said plasma burner; and the electrical energy of said electric arc discharge is coupled into matter formed by said gases streaming therepast.

4,930,395

PROJECTILE FOR ELECTRIC RAIL GUNS

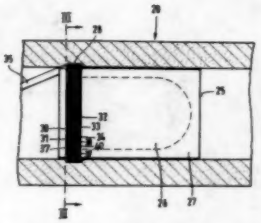
Markus Löffler, Unterlüss, Fed. Rep. of Germany, assignor to TZN Forschungs- und Entwicklungszentrum Unterlüss GmbH, Unterlüss, Fed. Rep. of Germany

Filed May 15, 1989, Ser. No. 351,517

Claims priority, application Fed. Rep. of Germany, May 13, 1988, 3816299

Int. Cl.[5] F41B *6/00*

U.S. Cl. 89—8 **8 Claims**



1. In a projectile to be fired from an electric rail gun having spaced current-carrying rails between which the projectile is accelerated when fired; said projectile ;having an armature being mounted on the projectile and being arranged to make contact simultaneously with the rails to electrically connect the rails to one another; the improvement wherein said armature comprises a plurality of axially aligned rings of boron-fiber reinforce aluminum and includes means for imparting a rotation thereto as the projectile is propelled through the electric rail gun.

4,930,396

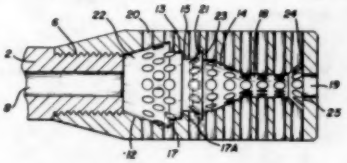
GUN MUZZLE BRAKE

Sam E. Johnson, 1519 Westbury Dr., Davison, Mich. 48423

Filed Jun. 15, 1989, Ser. No. 366,877

Int. Cl.[5] F41C *21/18*

U.S. Cl. 89—14.3 **14 Claims**



1. An improved muzzle brake for a gun barrel having a muzzle end and bore comprising:

a chamber formed inside said muzzle brake coaxial with said bore and freely communicating with a plurality of openings, having:

a first conical section having its widest diameter most distant said muzzle end formed into said chamber proximate said muzzle end;

an annular shoulder being disposed proximate said widest diameter of said first conical section;

a second conical section having its narrowest diameter

most distant said muzzle and disposed proximate said annular shoulder; and

a cylindrical section disposed proximate said narrowest diameter of said second conical section; and

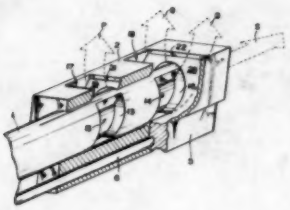
said plurality of openings spaced about the surface of said muzzle brake and extending into said muzzle brake and communicating with said chamber.

4,930,397

DEVICE FOR COMPENSATING THE RECOIL ENERGY OF SMALL ARMS

Heribert Seidler, Heiligenstadterstrasse 67, A-1190 Vienna, Austria

Filed Jun. 26, 1989, Ser. No. 371,603
Claims priority, application Austria, Jun. 24, 1988, 1645/88
Int. Cl.[5] F41A *21/36*
U.S. Cl. 89—14.3 **9 Claims**



1. A device for reducing the felt effects of recoil in a firearm, said firearm including a barrel and receiver, said device comprising;

a muzzle brake unattachedly disposed around the muzzle portion of said barrel, said barrel completely traversing said muzzle brake, said muzzle brake being provided with deflector surfaces for upwardly deflecting pressurized gases generated during the firing of a projectile, said gases being directed against said deflector surface through gas outlet openings provided in the portion of said barrel traversing said muzzle brake, said gas outlet openings aligning with the deflector surfaces; and

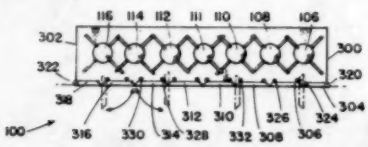
a retention means for securely retaining said muzzle brake to said firearm receiver in a fixed relation to the longitudinal axis of said barrel.

4,930,398

ALTERNATING DOOR HINGE LINES

G. F. Sharples, Mercer Island, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed May 31, 1988, Ser. No. 200,759
Int. Cl.[5] E05D *15/50*; F41F *5/02*; B64D *1/06*
U.S. Cl. 89—1.51 **14 Claims**



12. Apparatus for allowing the release of objects from the weapons bay of an aircraft wherein the weapons bay is defined by two side walls intermediate fore and aft end walls, said apparatus comprising:

a plurality of elongate doors, said plurality of elongate doors including first and second end doors and a plurality of interior doors;

means for pivotally mounting said first and second end doors to the side walls of the weapons bay;

journal means for supporting said plurality of interior doors such that each said interior door is pivotal about a first and second axis, said journal means including a plurality of journal housings fixed to the end walls of the weapons bay and a plurality of journal bearings fixed to said plurality of interior doors, said plurality of journal bearings being matably engageable with said plurality of said journal housings; and

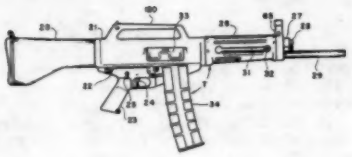
actuator means for selectively displacing said plurality of interior doors such that each said interior door is pivotal about its first and second axes.

4,930,399

HIGH VOLUME AUTOMATIC AND SEMI-AUTOMATIC FIREARM

John Trevor, Jr., 11432 SW. 113 Pl., Miami, Fla. 33176

Filed Jan. 9, 1989, Ser. No. 294,410
Int. Cl.[5] F41D *5/04, 11/02, 11/04*
U.S. Cl. 89—191.02 **17 Claims**



1. A firearm comprising:

a receiver portion having butt means for resting against the shoulder of a shooter;

a barrel extending forwardly from the receiver portion, said barrel having a charging end and a discharge end;

a gas tower in fluid communication with said barrel; a bolt carrier assembly slidably disposed in said gas tower whereby said bolt carrier assembly is actuated by gas pressure in said barrel from the discharge of a cartridge, the bolt carrier assembly further including a rearward end having a downwardly extending section having a first elongated slot with a longitudinal axis with respect to a longitudinal axis of the bolt carrier assembly, said downwardly extending section further including a second elongated slot having a longitudinal portion and downwardly directed cam portion disposed at the forward end, and a roller received in said second slot;

a bolt slidably connected to the bolt carrier assembly by a transverse bar fixed to the bolt and extending through the first elongated slot in the bolt carrier assembly whereby said bar and first elongated slot cooperate to limit axial movement of the bolt on the bolt carrier assembly, the bolt further having a recess in the upper surface thereof to receive the roller when said bolt carrier assembly is in a position rearward with respect to the bolt;

a firing pin disposed in said bolt;

a longitudinal track portion in said receiver and having an upwardly extending recess cooperating with said roller in the bolt carrier assembly;

wherein the roller is positioned in said recess in the track and in a rear portion of the second slot when the bolt carrier assembly is in a forward position with respect to the bolt and the receiver, and wherein rearward movement of the bolt carrier assembly with respect to the bolt causes the cam portion of the second elongated slot to engage the roller to move the roller into said recess in the bolt whereby said bolt carrier assembly and bolt move rearwardly with the roller engaging the track in the receiver and the recess in the bolt such that the bolt is in a fixed

position with the bolt carrier assembly during rearward travel.

4,930,400

MAGAZINE WITH LINKLESS CARTRIDGE FEED SYSTEM

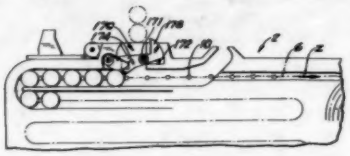
Rudolf Brandl, Dornhan-Weiden, and Heinz Matt, Oberndorf, both of Fed. Rep. of Germany, assignors to Heckler & Koch, GmbH, Oberndorf am Neckar, Fed. Rep. of Germany

Filed May 5, 1988, Ser. No. 190,501

Claims priority, application Fed. Rep. of Germany, Jun. 30, 1987, 3721527

Int. Cl.[5] F41C *25/02*

U.S. Cl. 89—34 **13 Claims**



1. A magazine having a load opening and comprising:

a linkless cartridge feed system provided with means for manual loading with cartridges through the load opening, and means for automatic and sequential feed of cartridges to a firearm barrel, said feed system including

a cartridge receiving device movable manually in a loading direction and automatically in an opposite feed direction;

a tensioning device engaged with said cartridge receiving device in said feed direction; and

a blocking means comprising first means for an automatic blocking of the feed system in the feed direction, during a loading phase of operation, and second means operated independently from and nonsimultaneously with said first means for an automatic blocking of the feed system in the loading direction when a cartridge is missing in the cartridge receiving device.

4,930,401

VALVE SYSTEM AND ARRANGEMENT FOR ON-LINE VALVE REPLACEMENT

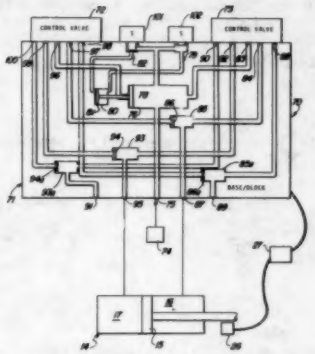
Russell J. Cameron, Rochester; Richard P. Krape, Lake Orion, and Robert N. Wiesand, Birmingham, all of Mich., assignors to Ross Operating Valve Company, Troy, Mich.

Filed Oct. 28, 1988, Ser. No. 263,690

Int. Cl.[5] F15B *13/04*

U.S. Cl. 91—32 **13 Claims**

1. A control valve arrangement for a system having a powered device and a system base in fluid communication with the powered device, the powered device having a plurality of ports for selective communication with a source of working fluid pressure or exhaust, a first control valve movable between at least two positions for controlling the powered device, a second control valve movable between at least two positions for controlling the powered device, circuit means for connecting said first and said second control valves in parallel communication with said source of working fluid pressure and with the ports of said powered device, and switching valve means located in said circuit means and cooperable with said first and said second control valves for selectively isolating the respective control valves from said source of working fluid pressure and from the ports of the powered device in order to allow replacement of one of said control valves while the other of said control valves controls the powered device, said switching valve means including a plurality of ports adapted to communicate with respective ports of the control valves, and wherein said switching valve means is housed in one of either



a block interposed between the control valves and the system base or in the system base.

4,930,402

HYDRAULIC LIFTING CYLINDER-PISTON UNIT

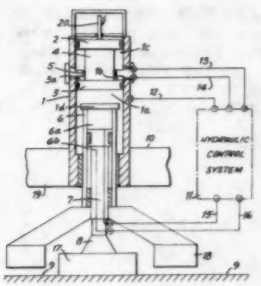
Hans Forchheim, Erdmannsdorf, and Matthias Schlieder, Oederan, both of German Democratic Rep., assignors to Bauakademie d. Deutschen Dem. Republik, Berlin, German Democratic Rep.

Filed May 27, 1988, Ser. No. 201,117

Claims priority, application Fed. Rep. of Germany, May 28, 1987, WPF16J/3032306; May 11, 1988, 3816092

Int. Cl.[5] F15B *11/18*

U.S. Cl. 91—167 R **3 Claims**

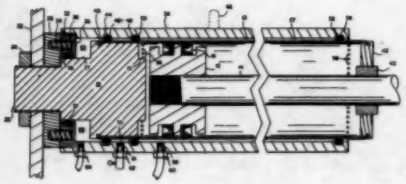


1. A hydraulic cylinder-piston unit, comprising primary cylinder-piston means with an integrated position regulation and with a primary cylinder and a primary piston movable in said primary cylinder; means forming two displacement chambers in said primary cylinder and including two displacement pistons, a displacement piston rod connecting said displacement pistons with one another, and a separating wall; and differential cylinder-piston means formed by said primary piston and having a differential cylinder provided with working chambers, said primary piston having a first face area, each of said displacement pistons having a second face area, and a ratio of said first face area of said primary piston to a cross-section of said differential cylinder is equal to a ratio of said second face area of each of said displacement pistons to an area of an annular surface formed between each of said displacement pistons and said displacement piston rod.

4,930,403
DIRECTIONALLY CONTROLLED HYDRAULIC CYLINDER

Royce Husted, 711 Lakeside Dr., Wheaton, Ill. 60187

Filed Jan. 13, 1989, Ser. No. 297,551
Int. Cl.[5] F15B *11/08*
U.S. Cl. 91—443 12 Claims

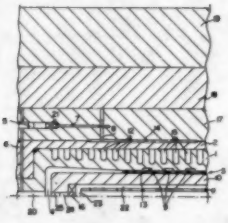


1. In combination:
a cylindrical body having a plurality of air passageways at at least one end;
a piston movable within said body;
a cylindrical sleeve overlying said cylindrical body and mounted for movement along said body;
a pair of seal means for forming a manifold between said cylindrical sleeve and said cylindrical body;
an inlet in said cylindrical sleeve between said pair of seal means for admitting compressed air to said manifold; and
said seal means being positioned to selectively expose said passageway to said compressed air for moving said piston.

4,930,404
VERY HIGH PRESSURE PISTON PUMP

Fritz Zbinden, Dorfstrasse, CH-8479 Oberwil, Switzerland

PCT No. PCT/EP87/00786, § 371 Date Aug. 19, 1988, § 102(e) Date Aug. 19, 1988, PCT Pub. No. WO88/04731, PCT Pub. Date Jun. 30, 1988
PCT Filed Dec. 16, 1987, Ser. No. 252,279
Int. Cl.[5] F01B *31/14*
U.S. Cl. 92—60.5 13 Claims

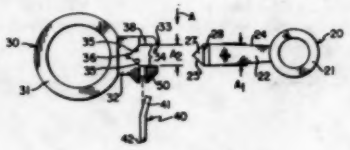


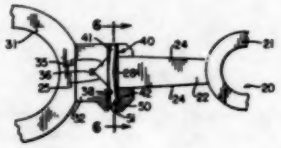
1. A very high pressure piston pump, comprising a piston (10), the piston (10) is movable in a sealing manner in a casing (1) with an ice layer positioned between the piston (10) and the casing (1), at least one of the piston (10) and the casing (1) can be cooled, an internal diameter of the casing (1) is variable with a first pressure medium engaging near the casing (1); and an external diameter of the piston (10) is variable with a second pressure medium engaging in an interior of the piston (10), and the piston (10) is rotatable in the casing (1) in order to reduce translational frictional forces.

4,930,405
RECIPROCATING PISTON COMPRESSOR FOR SMALL REFRIGERATING MACHINES AND ASSEMBLY METHOD THEREFOR

Dietmar E. B. Lilie, Joinville, Brazil, assignor to Empresa Brasileira de Compressores S/A, Brazil

Filed Dec. 5, 1988, Ser. No. 280,131
Claims priority, application Brazil, Dec. 17, 1987, 8707047
Int. Cl.[5] F01B *29/00*
U.S. Cl. 92—128 10 Claims





1. Reciprocating Piston Compressor for a small Refrigerating Machine, of the type including a connecting rod with its first eye connected to the compressor piston by means of a wrist pin and connected with its second eye to the crank pin of a crankshaft, wherein the second eye of the connecting rod includes a radial projection with opposite lateral faces, superior and inferior faces, said radial projection being provided with a longitudinal slot having at least two end faces and two opposite lateral faces; a first eye provided with a lengthened radial rod having its end portion provided with at least two end faces, two opposite lateral faces, superior and inferior faces, said lengthened radial rod being fitted in the said longitudinal slot of the second eye, the axia distance between the centres of the eyes being defined by the contact between two faces of the end portion of the rod and two corresponding end faces of the longitudinal slot, characterized in that at least a fastening clamp (40) is fitted in respective housing defined by grooves (38, 39) made in the radial projection (32) of the second eye (31) and by grooves (28, 29) made in the end portion of the rod (22), said clamp (40) being designed in such a way as to press, due to its elastic action when it is fitted in the respective groove (38, 28, 39, 29) both parts (20, 30) of the connecting rod to a position of minimum axial distance between the centres of the eyes (21, 31) and fastening these parts (20, 30) in a relative and predetermined position of the eyes (21, 31).

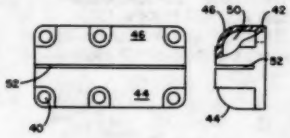
4,930,406
REFRIGERANT GAS COMPRESSOR CONSTRUCTION

Milton M. Koufeld, Bristol, Tenn., assignor to Bristol Compressors, Inc., Bristol, Va.

Filed Sep. 21, 1988, Ser. No. 247,405
Int. Cl.[5] F01B *31/08*
U.S. Cl. 92—144 5 Claims

1. A refrigerant compressor having cylinder means, piston means mounted for reciprocation in said cylinder means, and a unitary, elongated, cylinder head mounted over the end of said cylinder means and comprising a base, a first wall providing an elongated suction chamber and a second wall providing an elongated discharge chamber, each of said walls being unitary

with said base, said suction and discharge chambers being side-by-side and elongated with their exterior adjacent side walls separated the full length of said head to provide a thermal



barrier, wherein the ratio of the volume (in^3) of the thermal barrier to the combined surface area (in^2) of contiguous side walls is from 0.003 to 0.3.

4,930,407

SENSING SYSTEM FOR CONTROLLING AIR CIRCULATION VALVES IN MOTOR VEHICLES

Heinz Hölter, Gladbeck, and Hanns Rump, Unna-Massen, both of Fed. Rep. of Germany, assignors to Heinz Holter, Gladbeck, Fed. Rep. of Germany

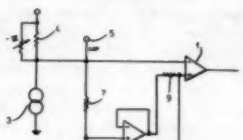
PCT No. PCT/EP87/00592, § 371 Date Jun. 3, 1988, § 102(e) Date Jun. 3, 1988, PCT Pub. No. WO88/02704, PCT Pub. Date Apr. 21, 1988

PCT Filed Oct. 10, 1987, Ser. No. 216,622

Claims priority, application Fed. Rep. of Germany, Oct. 11, 1986, 3634786; Dec. 31, 1986, 8634907

Int. Cl.[5] B60H *1/24*

U.S. Cl. 98—2.01 **19 Claims**



1. A sensing system for controlling air circulation valves of motor vehicles, comprising:

a pollutant detecting and electronic preconditioning sensor means which is a semiconductor, said means generating one or more signals related to a measured level of pollutants;

a switch amplifier receiving said signals, said amplifier having a variable operating switchpoint dependent upon the received signals; and

a means for integrating said one or more signals.

4,930,408

LARGE CAPACITY PRESSURE COOKER

James D. King, Dayton, and Stephen D. Werts, Eaton, both of Ohio, assignors to Henny Penny Corporation, Eaton, Ohio

Filed Dec. 13, 1988, Ser. No. 283,571

Int. Cl.[5] A47J *37/12*

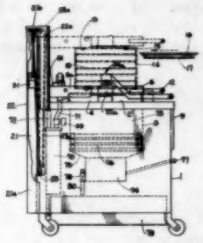
U.S. Cl. 99—407 **18 Claims**

1. A pressure cooker comprising a housing mounting an open top vat for receiving cooking oil,

a horizontally disposed lid for closing and sealing the top of the vat,

a pair of vertically extending guide rails at the rear of said housing, a carriage movably mounted on said guide rails, a pair of mounting arms engaging the opposite sides of said lid, said mounting arms being secured to said carriage for movement therewith, counterbalancing mean associated with said carriage to assist in moving the said lid vertically from an open position in which it is elevated relative to said vat to a closed position in which said lid is seated on the top of said vat,

carrier means for product to be cooked mounted on the underside of said lid and positioned to enter said vat as said lid is moved to the closed position, and



locking means mounted on said housing and positioned to engage said lid when in its closed position, said locking means including a handle for moving said locking means from an inoperative position in which said lid is free to be opened and closed to an operative position in which said locking means engages and seals said lid against the top of said vat, and releasable latch means operative to secure said handle against movement when said locking means is in its operative position.

4,930,409

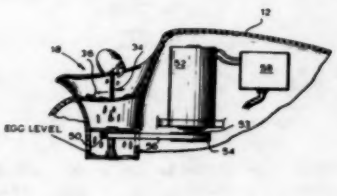
EGG STORING AND PROCESSING MACHINE

Stamatios Stefanakis, 68 Brandy La., Lake Grove, N.Y. 11755

Filed Dec. 20, 1988, Ser. No. 286,931

Int. Cl.[5] A23B *5/00*; B01F *15/06*

U.S. Cl. 99—484 **5 Claims**



1. An egg storing and processing machine, comprising:

(a) a housing, having a bottom and a top covering portion disposed at an uppermost surface of said housing;

(b) a storage drawer disposed in said housing for storing unshelled eggs;

(c) a refrigeration system within said housing to preserve said unshelled eggs stored in said storage drawer;

(d) a means on and within said housing for dispensing and metering consecutively measured portions of shelled eggs comprising a sieve, an eggshell breaker mounted below said top covering portion and above said sieve, said sieve provided with a plurality of holes of a mesh size so that said sieve retains eggshell fragments from unshelled eggs broken on said eggshell breaker, but permits shelled egg fluid passage, a mixer located below and in fluid communication with said sieve and above said bottom of said housing, a funnel hopper located below and in fluid communication with said mixer and above said bottom of said

housing, said funnel hopper having a reciprocating substantially horizontal hopper door disposed therein and below said mixer and above said bottom of said housing, a hopper door reciprocating mechanism to open and close the hopper door to permit metering of said portions of said shelled eggs, a dispensing spout connected to and in fluid communication with said funnel hopper; and

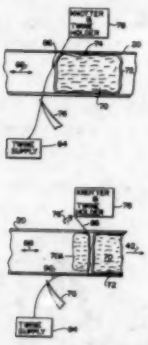
(e) a time control unit connected to said door mechanism to activate said door mechanism to open said hopper door for a predetermined time to permit a predetermined portion of shelled eggs to be metered and dispensed, and to activate said door mechanism to close said hopper door when said predetermined time has elapsed.

4,930,410

METHOD OF DENSITY CONTROL IN RECTANGULAR BALERS TO IMPROVE THE BALE TYING OPERATION

Marnix J. Schoonheere, Ichtegem; Christiaan A. C. Lippens, Sint-Laureins, and Adrianus Naaktgeboren, Zedelgem, all of Belgium, assignors to Ford New Holland, Inc., New Holland, Pa.

Filed Apr. 14, 1989, Ser. No. 338,175
Int. Cl.[5] B65B *13/02*
U.S. Cl. 100—3 **2 Claims**



1. In a rectangular baler having control means for controlling the density to which a crop material entering a bale case is compacted, a cyclically operable compacting means for compacting said crop material and pushing said compacted crop material toward an exit opening in said bale case, and a cyclically operable tying mechanism for carrying out a tying process wherein loops of a binding material are tied around successive lengths of said compacted crop material, said loops separating said crop material into bales, said tying mechanism, at the end of each cycle thereof, holding a portion of said binding material which is to become part of the next loop such that said portion extends across said bale case in the path of compacted crop material, a method for reducing the frequency of failure of the tying process, said method comprising:

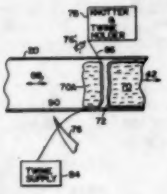
operating said control means so that crop material entering said bale case is compacted to a first density for an interval of time after the completion of each cycle of said tying mechanism after which the said crop material is compacted to a second density greater than said first density until the succeeding cycle of said tying mechanism is initiated.

4,930,411

APPARATUS FOR DENSITY CONTROL IN RECTANGULAR BALERS TO IMPROVE THE BALE TYING OPERATION

Adrianus Naaktgeboren, Zedelgem, Belgium, assignor to Ford New Holland, Inc., New Holland, Pa.

Filed Apr. 14, 1989, Ser. No. 338,170
Int. Cl.[5] B65B *57/10*; B30B *15/26*
U.S. Cl. 100—4 **8 Claims**



1. A rectangular baler comprising:

compaction means for compacting a crop material fed into said baler;

a cyclically operable bale tying mechanism for tying a binding material around successive increments of said compacted material to form bales;

bale length measuring means for producing a first output signal after each cycle of said bale tying mechanism and a second output signal when said compaction means has compacted crop material of a predetermined length after each cycle of said bale tying mechanism; and,

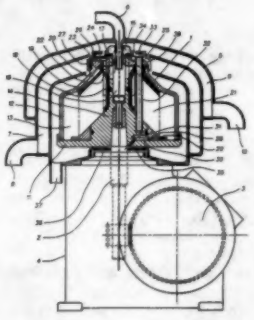
control means responsive to said first and second output signals for controlling said compaction means to compact said crop material to a first density during the interval between each second output signal and the next occurring first output signal and controlling said compaction means to compact said crop material to a second density, less than said first density, for the interval between each first output signal and the next occurring second output signal.

4,930,412

CENTRIFUGAL SEPARATOR

Klaas Stroucken, Rönninge, Sweden, assignor to Alfa-Laval Separation AB, Tumba, Sweden

Filed Sep. 28, 1988, Ser. No. 250,176
Claims priority, application Sweden, Oct. 13, 1987, 87039657
Int. Cl.[5] B04B *1/08*
U.S. Cl. 494—70 **10 Claims**



1. Centrifugal separator for the separation of two liquids having different densities from a mixture thereof, comprising a

rotor body having a separation chamber having two ends and an axis of rotation, said separation chamber having inlet and outlet ends, a stack of conical separation discs, said discs each having a surface, an apex portion and a base portion, said discs being arranged coaxially with the rotor body in the separation chamber with their base portions facing one end, their apex portions facing the other end of the separation chamber and their sirfaces inclined from the base portion to the apex portion at an angle to the axis of the rotor body, said rotor body having a central inlet chamber, inlet passages connecting the inlet chamber with the separation chamber at the end of the separation chamber towards which the apex portions of the separation discs face, and separate outlets for separated relatively light and relative heavy liquid fractions, which outlets are situated at the same axial outlet end of the rotor body, said inlet passages having substantially the same inclination relative to the rotor body axis as the surfaces of the separation discs, and at least one outlet channel extending from a radially outer part of the separation chamber towards the axis of the rotor body at the end of the separation chamber towards which the bases of the separation discs face, said outlet channel communicating with said outlet for separated heavy liquid at the outlet end of the rotor.

4,930,413

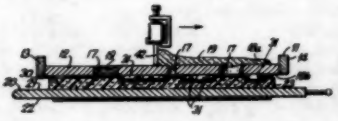
APPARATUS AND METHOD FOR THREE-DIMENSIONAL SCREEN PRINTING

David Jaffa, Franklin Lakes, N.J., assignor to Artwave America Inc., Hawthorne, N.J.

Filed Apr. 7, 1989, Ser. No. 334,354

Int. Cl.[5] B41F *15/18, 15/36*

U.S. Cl. 101—126 **6 Claims**



1. A screen printing apparatus comprising in combination:

a printing pallet comprising a support material having a lower and an upper surface, a resilient compressible substrate having a lower surface and having a planar, soft, compressible upper surface, and an attachment means for holding said lower surface of said substrate onto said upper support surface; and,

a printing screen comprising an expanse of material having at least one perforation therethrough, and further comprising baffle means attached to the lower surface of said expanse of material, said baffle means sized and located to effectively protect a previously printed raised image on the said pallet-supported article by contacting said article at points proximate to said raised image so as to deflect said image into said compressible substrate during a printing operation in which said screen is pressed against said article.

4,930,414

SHEET FED ROTARY PRINTING PRESS FOR PERFORMING ALTERNATIVELY SINGLE-SIDE MULTICOLOR PRINTING OR FIRST FORM AND PERFECTOR PRINTING

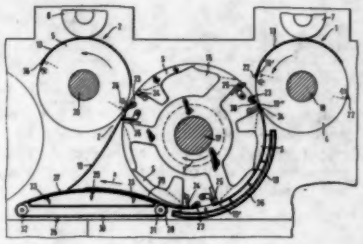
Arno Wirz, Bammental, Fed. Rep. of Germany, assignor to Heidelberger Druckmaschinen AG, Heidelberg, Fed. Rep. of Germany

Continuation of Ser. No. 197,289, May 23, 1988, abandoned. This application Oct. 23, 1989, Ser. No. 426,499

Claims priority, application Fed. Rep. of Germany, May 21, 1987, 3717093

Int. Cl.[5] B41F *5/02*; B41L *15/10*

U.S. Cl. 101—183 **10 Claims**



1. A sheet-fed rotary printing press for performing alternatively single-side multicolor printing or first form and perfector printing with a sheet transfer cylinder disposed in a direction of travel of a sheet between impression cylinders of two printing units, all of the cylinders having first grippers mounted on the cylinders at the periphery thereof for releasably gripping a leading edge of the sheet, comprising a sheet support disposed downstream from the sheet transfer cylinder in the travel direction of the sheet and having an upper support surface in the form of an arc with a diameter greater than that of the sheet transfer cylinder, said sheet support comprising a revolving belt in the form of an elongated loop extending substantially tangentially to the sheet transfer cylinder, said loop having a respective upper and lower run spaced from one another a relatively smaller distance in comparison with the length of said elongated loop, the sheet transfer cylinder carrying second grippers at the periphery thereof having means for gripping a trailing edge of the sheet, the sheet transfer cylinder being rotatable and the first grippers being actuatable for releasing the leading edge of the sheet so as to deposit the sheet on said support surface, with a free leading edge thereof first, as said second grippers approach said sheet support, the sheet transfer cylinder being further rotatable beyond said sheet support with said gripping means of said second grippers maintaining their grip on the trailing edge of the sheet so that the sheet is lifted from said support surface with the trailing edge thereof leading the leading edge thereof.

4,930,415

AUTOMATIC WEB GUIDE ROLLER CLEANING DEVICE

Akira Hara, Tokyo, Japan, and John MacPhee, Rowayton, Conn., assignors to Baldwin-Japan Limited, Tokyo, Japan

Filed Jan. 24, 1989, Ser. No. 301,044

Claims priority, application Japan, Feb. 10, 1988, 63-29659; Feb. 10, 1988, 63-16843[U]

Int. Cl.[5] B41F *13/54*

U.S. Cl. 101—228 **6 Claims**

1. A web guide roller with an automatic cleaning device comprising:

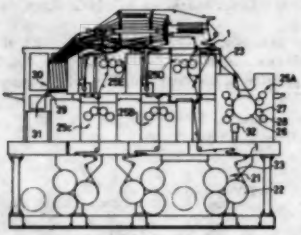
a roller body for guiding a web;

shafts intermediately jointed and rotatably supporting said roller body at opposite ends thereof;

side frames for fixing said shafts;

a motor whose stator is fixed to the interior of said roller body; and

a reduction unit having an input shaft thereof connected to a rotor of said motor and an output shaft thereof connected to one of said shafts for rotatably supporting said roller



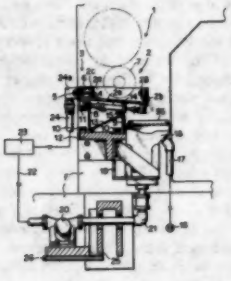
body at opposite ends thereof; wherein there is provided a mechanism for allowing one of the shafts for rotatably supporting said roller body at the opposite ends thereof and said output shaft of said reduction unit to be engaged with or released from each other.

4,930,416

APPARATUS FOR QUICKLY DISCHARGING INK FROM INK SUPPLY DEVICE

Takanobu Kawahata, and Noritake Harada, both of Yokohama, Japan, assignors to Kabushiki Kaisha Tokyo Kikai Seisakusho, Tokyo, Japan

Filed Oct. 26, 1988, Ser. No. 262,895
Claims priority, application Japan, Mar. 2, 1988, 63-49314
Int. Cl.[5] B41F *31/06;* B41L *27/08*
U.S. Cl. 101—364 1 Claim



1. An apparatus for quickly discharging ink from a ink supply device including

an ink reserve vessel being composed of a bottom member and surrounding side wall members;

means for shifting at least a portion of at least one member of said bottom and surrounding side wall members between a closed position in which said at least one member contacts said other members to form said ink reserve vessel and an open position in which said at least one member separates from the said other members adjacent the bottom level of said ink reserve vessel;

at least a portion of the inner surface of said bottom member directed obliquely such that said inner surface is progressively decreased in height toward said at least one member;

an ink supplement gutter which abuts on said ink reserve vessel via a partition formed by one of said surrounding side wall members;

ink supplement holes extending through said partition and inclined obliquely downward;

valves providing inlets to said ink supplement holes and located in opposing alignment with said ink supplement holes;

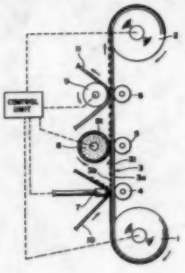
and said inlets being flush with the inner bottom surface of said ink supplement gutter.

4,930,417

PRINTER FOR SIMULTANEOUSLY FORMING PLANOGRAPHIC PRINTING SURFACES AND PRINTING INK IMAGES

Minoru Isobe, Tokyo, Japan, assignor to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Jan. 6, 1989, Ser. No. 294,770
Claims priority, application Japan, Jan. 29, 1988, 63-16887
Int. Cl.[5] B41C *1/10;* B41N *1/12;* B41M *1/08*
U.S. Cl. 101—465 9 Claims



1. A printer capable of simultaneously forming a planographic printing surface and printing ink images, comprising:

a control unit;

a printing plate formed by an oil-repellent sheet coated with a fusible or heat-sublimable lipophilic thermal film layer, said lipophilic thermal film layer defining an effective surface of said printing plate;

a plate feeding unit for continuously feeding said printing plate;

a plate making unit comprising a thermal head connected to said control unit for locally and selectively heating the lipophilic thermal film layer according to electric signals applied thereto by the control unit, and a backup roller for pressing the printing plate, as fed by said plate feeding unit, against the thermal head to locally and selectively remove portions of the lipophilic thermal film layer and expose areas of the oil-repellent sheet to make a planographic printing surface having a printing area;

an inking unit comprising an ink tank containing a liquid ink, an inking roller partially dipped in the liquid ink contained in the ink tank, and a pressure roller for pressing the printing plate, as fed by said plate feeding unit, against the circumference of the inking roller to ink the printing area of the planographic printing surface; and

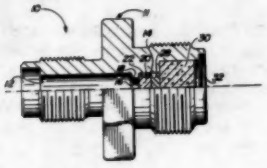
a transfer unit comprising a platen roller for continuously feeding a recording medium, and a pressure roller for pressing the planographic printing surface of the printing plate, as fed by said plate feeding unit, against the recording medium being fed by the platen roller to transfer the inked pattern of the printing area to the recording medium.

4,930,418

METHOD FOR SEALING OPTICAL WINDOWS IN EXPLOSIVE INITIATORS

Mark Folsom, Hollister, Calif., assignor to Whittaker Ordnance, Inc., Hollister, Calif.

Filed Jun. 23, 1989, Ser. No. 370,495
Int. Cl.[5] F42C *19/00*; C03C *27/02, 29/00*
U.S. Cl. 102—201 10 Claims



1. An improved method for sealing optical windows in explosive initiators, said method comprising:

(a) disposing a solid body optical window in a passageway in a wall of an explosive initiator body to provide an annular space between said passageway wall and the outer periphery of said optical window body;

(b) filling said annular space with solder glass to form an assembly;

(c) heating said assembly to above the melting point of said solder glass for a time sufficient to melt said solder glass and fuse it to said optical window and said passageway wall so as to seal said optical window body in said passageway against leaks;

(d) thereafter cooling said assembly to ambient temperature sufficiently slowly so as to prevent cracking of said solder glass and window.

4,930,419

ORDNANCE FUZE POWER SOURCE

Victor M. Serby, 255 Hewlett Neck Rd., Woodmere, N.Y. 11598

Filed May 23, 1989, Ser. No. 355,768
Int. Cl.[5] F42C *19/00*
U.S. Cl. 102—207 9 Claims

1. An ordnance fuze power source having a breech end, a muzzle end and a spin axis, said spin axis intersecting said muzzle end and said breech end, said ordnance fuze power source comprising:

(a) a lithium anode primary cell;

(b) an acceleration activated switch having a first open state in absence of a threshold applied acceleration, said switch having a responsive axis, said switch having a second closed state in the presence of an applied threshold acceleration along said responsive axis, said switch connected in series electrically with said cell ,said switch physically positioned within said fuze power source radially away from said spin axis, said switch having said responsive axis aligned toward said spin axis;

(c) means for securing said cell and said switch from relative motion under applied gunfire acceleration; and

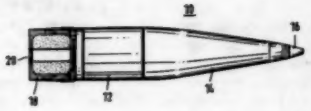
(d) means for connecting said series connection of said cell and switch to an electrical load so that in the presence of an applied acceleration above a threshold value along said responsive axis, said switch will close and an electric current will be delivered to said load.

4,930,420

SEAL FOR THE NOZZLE OPENING OF A PROJECTILE

Wolfgang Meffert; Kalr-Heinz Silligmann; Siegmar Fischer, all of Düsseldorf, and Ulf Hahn, Ratingen, all of Fed. Rep. of Germany, assignors to Rheinmetall GmbH, Düsseldorf, Fed. Rep. of Germany

Filed Jun. 8, 1989, Ser. No. 362,946
Claims priority, application Fed. Rep. of Germany, Jun. 9, 1988, 3819640
Int. Cl.[5] F42B *13/02, 13/267, 15/00*; F42C *19/08*
U.S. Cl. 102—374 7 Claims



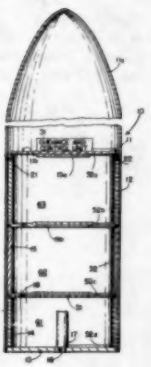
1. In a projectile including a propellant charge and a nozzle opening provided in a rear projectile part and serving as an exit for propellant charge gases during flight of the projectile; a rupturable sealing disc closing the nozzle opening for protection against environmental influences; the improvement wherein said sealing disc is resilient and is of a material selected from the group consisting of rubber and plastic; further wherein said sealing disc has a circumferential marginal zone and a center zone and is attached to said rear projectile part; said circumferential marginal zone having a greater thickness than that of said center zone.

4,930,421

PARTITIONED, FLUID SUPPORTED, HIGH EFFICIENCY TRAVELING CHARGE FOR HYPER-VELOCITY GUNS

Kenneth A. B. Macdonald, Maple Valley, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Jul. 11, 1988, Ser. No. 217,268
Int. Cl.[5] F42B *15/10*
U.S. Cl. 102—377 18 Claims



1. A traveling charge projectile comprising:

a hollow cylindrical projectile body having a central payload cavity, an aft end and a front end;

a plurality of propellant charge segments, each containing granular propellant of progressively smaller grain size,

mounted in a stacked column for sequential initiation, and attached to the aft end of said projectile body;

a plurality of electrically initiated propellant charge segment initiators, each mounted on a different one of said propellant charge segments, for sequential initiation by a remote firing signal for igniting and propelling granular propellant into the volume aft of said projectile body when said projectile is fired in a gun barrel;

means electrically connected to said plurality of electrically initiated propellant charge segment initiators for initiating said initiators in response to an external firing signal; and

means for generating a firing signal indicative of optimum propellant charge segment initiation sequence timing including means for measuring projectile instantaneous velocity while said projectile is traversing said gun barrel and means responsive to projectile instantaneous velocity for providing timed initiation pulses to the respective propellant charge segments which further comprises:

an electrical relay, which controls electric current in response to acceleration, positionable between an open position interrupting the flow of electric current and a closed position permitting the flow of electric current, for initiating the firing process;

an electricity storage member electrically connected to said electrical relay for providing electric power if said relay is in the closed position;

a crystal oscillator clock, electrically connected to said electricity storage member for providing a periodic signal when said electrical relay is in the closed position;

a microprocessor having an associated electronically erasable programmable read only memory, electrically connected to said crystal oscillator clock and said means for measuring projectile instantaneous velocity while said projectile is traversing said gun barrel; and

a plurality of bridge wires, each electrically connected to said microprocessor, and each positioned within a separate one of said plurality of electrically initiated propellant charge initiators;

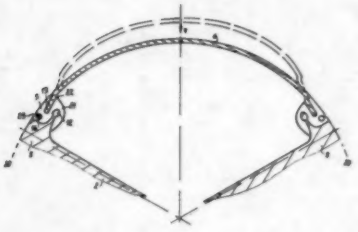
said means for generating a firing signal being electrically connected to each of said plurality of electrically initiated propellant charge segment initiators.

4,930,422

EJECTABLE, IMPERVIOUSLY SEALING DEVICE ESPECIALLY FOR ROCKETS WITH MUNITIONS

René Thouron, La Ferte St Aubin, and Jean-Francois Denis, Checy, both of France, assignors to Thomson-Brandt Armements, Boulogne-Billancourt, France

Filed May 24, 1988, Ser. No. 198,091
Claims priority, application France, May 26, 1987, 87 07421
Int. Cl.[5] F42B *15/10*
U.S. Cl. 102—378 **8 Claims**



1. A missile comprising at least one compartment, said compartment containing at least one munition and being closed by means of a device located at the periphery of said missile, said device comprising:

a lid;

an elastic shaped section, inside which the edge of said compartment structure and the rim of said lid are embedded in an imperviously sealed way;

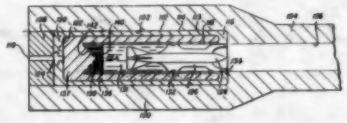
means for thrusting said lid outward from said structure, said shaped section, under the effect of said thrust, ensuring the separation of said edge from said rim, said separation modifying the aerodynamic drag coefficient of the missile, and causing total expulsion of said lid.

4,930,423

LIQUID PROPELLANT WEAPON SYSTEM

Melvin J. Bulman, Colchester, Vt., assignor to General Electric Company, Pittsfield, Mass.

Division of Ser. No. 150,351, Dec. 16, 1987, Pat. No. 4,852,458.
This application Dec. 18, 1988, Ser. No. 300,638
Int. Cl.[5] F42B *5/02, 5/16*
U.S. Cl. 102—440 **3 Claims**



1. A round of ammunition comprising:

a cartridge case having an aft base and a forward opening;

a tube fixed to said case and having an open forward end providing said case forward opening and having an open aft end;

a projectile disposed in said tube and closing said case forward opening;

a primer disposed in said base;

a cavity generator disposed in said tube between said projectile and said base;

a volume of liquid propellent captured in said tube between said projectile and said cavity generator;

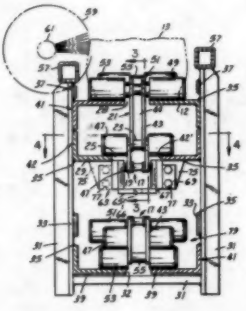
a volume of solid propellant disposed between said primer and said cavity generator.

4,930,424

CONVEYOR CHAIN GUIDE

Graham Astley, Novi, Mich., assignor to Belanger, Inc., Northville, Mich.

Filed Jun. 6, 1988, Ser. No. 203,189
Int. Cl.[5] B61B *13/00*
U.S. Cl. 104—172.3 **12 Claims**



1. A conveyor for transporting a vehicle in one direction comprising:

a substantially horizontal first track having a longitudinal slot centered upon a longitudinal axis;

a power-driven endless chain;

a second track spaced from and underlying the first track,

overlying the chain and having a central slot extending along said longitudinal axis;

at least one tire-engaging dolly connected to said chain and including an upright arm movably mounted upon said first and second tracks and at one end extending through said longitudinal slot;

a connector link extending through said second track slot pivotally interconnecting the other end of said arm and said chain for longitudinal movements in unison;

a pair of elongated laterally spaced conveyor chain guide plates defining a chain guide centrally underlying said second track arranged upon opposite sides of said longitudinal axis and secured thereto, the chain guide cooperatively receiving said chain and maintaining it in registry with said axis against lateral deflection;

the mounting of said chain guide plates including a pair of longitudinally spaced upright side brackets upon each guide plate; and

corresponding opposed pairs of longitudinally spaced mount brackets depending from said second track to which said side brackets are adjustably secured.

4,930,425

SUSPENSION CONVEYOR WITH RESILIENTLY DEFORMABLE DRAG MATERIAL

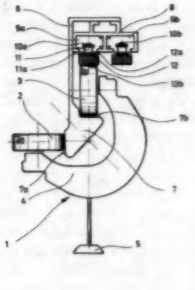
Martin Pönisch, Zorneding; Josef Hafner, and Rolf Schönenberger, both of Landsberg, all of Fed. Rep. of Germany, assignors to Veit Transpo GmbH, Landsberg/Lech, Fed. Rep. of Germany

Filed Aug. 10, 1988, Ser. No. 230,388

Claims priority, application Fed. Rep. of Germany, Aug. 28, 1987, 3728843

Int. Cl.[5] B61B *13/00*; B65G *17/32*

U.S. Cl. 104—172.4 **29 Claims**



1. A suspension conveyor having a horizontally disposed first track section and a second track section extending vertically at an angle to the horizontal, comprising:

a carriage having at least one caster for travelling on the first and second track sections;

drive means including an elongate flexible drive transmission member, the drive means including:

a resiliently deformable drag material having a backup supported surface attached to one of either the drive means or the carriage, and a free surface compressible a first predetermined amount upon frictional engagement with the other one of the carriage and drive means during travel over the horizontal first track section;

said free surface and the corresponding other one of the carriage and the drive means being disposed relative to one another for increasing the compression of the drag material to an amount greater than the first predetermined amount during travel of the carriage over the second track section.

4,930,426

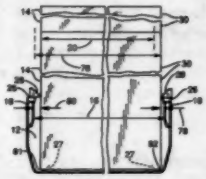
DEVICE FOR CHANGING THE EFFECTIVE WIDTH OF A CONTAINER WELL OF A FREIGHT CAR

Gregory J. Saxton, Portland, and Gary S. Kaleta, Warren, both of Oreg., assignors to Gunderson, Inc., Portland, Oreg.

Filed Nov. 30, 1988, Ser. No. 278,616

Int. Cl.[5] B61D *45/00*; B60P *1/64*

U.S. Cl. 105—355 **24 Claims**



1. An adjustable guide and spacer device for a container well of a railroad car, comprising:

(a) a base;

(b) a guide body, supported by said base and having an inner side and an outer side, said guide body being movable translationally with respect to said base, between an outer position and an inner position in which a portion of said guide body projects beyond said base, said guide body including an upwardly exposed container guiding surface, said container guiding surface being sloped downwardly and in the direction of said inner side; and

(c) latch means for latching said guide body in a selected one of said inner and outer positions.

4,930,427

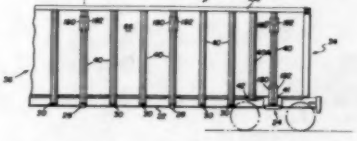
RAILROAD GONDOLA OR HOPPER CAR, PARTICULARLY A COAL CAR

John A. Ritter, Cincinnati, Ohio; Jan Z. Tomaka, and Jozes A. Muda, both of Quebec, Canada, assignors to Thrall Car Manufacturing Company, Chicago Heights, Ill. and Alcan International Limited, Quebec, Canada

Continuation-in-part of Ser. No. 128,930, Dec. 4, 1987, Pat. No. 4,840,127. This application Nov. 30, 1988, Ser. No. 277,776

Int. Cl.[5] B61D *17/10*

U.S. Cl. 105—406.1 **26 Claims**



1. A railroad gondola car comprising:

a center sill;

a pair of generally vertical car end walls;

a pair of generally vertical car side walls joined to the car end walls;

a longitudinal side sill at the bottom of each car side wall;

a longitudinal top chord at the top of each car side wall;

a body bolster near each end of the car extending from the center sill to the side sills;

a railway truck having a bolster;

each body bolster adapted to be supported on a railway truck bolster;

a plurality of cross bearers extending from the center sill to the side sills;

each vertical side wall including a vertical side wall plate having a lower horizontal edge joined to the side sill and an upper horizontal edge joined to the top chord;

a plurality of spaced apart vertical posts joined to the vertical side wall plate and with one or more vertical posts being joined to body bolsters and cross bearers;

a floor plate supported by the body bolsters and the cross bearers with said floor plate extending for substantially the distance between the end walls and the side walls but having side edges spaced inwardly a short distance from the respective side plate; and

each side sill having a horizontal leg on top of the floor plate and a downwardly depending rib on the bottom of the horizontal leg extending into contact with the body bolsters and cross bearers between the respective edges of the floor plates and the car side wall plate.

4,930,428

CEMENT COMPOSITION COMPRISING SODIUM TRIPOLYPHOSPHATE AND PROCESS FOR FORMING SHAPED ARTICLES THEREFROM

John F. Schneider, and Kurt A. Schneider, both of 3956 - 200th St. E., Farmington, Minn. 55024

Filed Jun. 2, 1989, Ser. No. 360,284

Int. Cl.[5] C04B *22/16*

U.S. Cl. 106—640 **35 Claims**

1. A high-strength concrete composition formed from a combination of ingredients comprising:

(a) about 0–85 weight percent aggregate;

(b) about 7–90 weight percent dry cement;

(c) about 0–50 weight percent fly ash; and

(d) about 3–10 weight percent treated water;

wherein the treated water contains about 0.5–100 ppm of residual sodium tripolyphosphate and the weight percents are relative to the total weight of the composition.

4,930,429

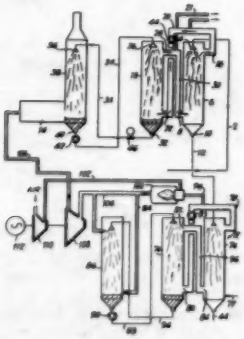
APPARATUS AND PROCESS FOR GENERATING STEAM FROM WET FUEL

Rolf Ryham, Princeton, N.J., assignor to Ahlströmföretagen Svenska AB, Norrköping, Sweden

Continuation-in-part of Ser. No. 231,085, Aug. 11, 1988, Pat. No. 4,878,441. This application Sep. 1, 1989, Ser. No. 402,076

Int. Cl.[5] F23G *5/12*

U.S. Cl. 110—229 **18 Claims**



7. A process for treating fuel comprising:

(a) gasifying fuel with heated gas to produce fuel gas;

(b) generating said heated gas by bringing gas into direct contact with a hot heat carrier;

(c) combusting at least part of said fuel gas to produce hot flue gas;

(d) generating said hot heat carrier by directly contacting a heat carrier with said hot flue gas; and

(e) utilizing said hot heat carrier as the heating medium in step (b).

4,930,430

BURNERS

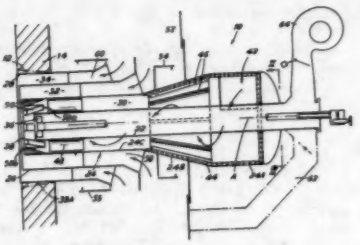
Jeffrey W. Allen, Tollerton; Peter R. Beal, Bramcote Hills, and Dennis R. Whinfrey, Mickleover, all of England, assignors to Northern Engineering Industries PLC, Newcastle Upon Tyne, England

Filed Mar. 2, 1989, Ser. No. 317,743

Claims priority, application United Kingdom, Mar. 4, 1988, 8805208; Dec. 13, 1988, 8829061

Int. Cl.[5] F23D *1/02*

U.S. Cl. 110—264 **13 Claims**



1. A burner for the combustion of pulverised fuel in an air stream, comprising a passage having a central axis, an inlet for admitting a flow of said fuel mixed in the air stream and an outlet axially spaced from said inlet at which outlet primary combustion of the air-fuel mixture takes place, means extending to adjacent said outlet means for supplying supplementary air for combustion with the products of said primary combustion, a plurality of individual guide elements located in the passage in positions angularly spaced about the central axis of the passage, means upstream of the guide elements to impart to the flow in the passage a rotary swirl about said control axis, said guide elements projecting substantially the full radial depth of the passage and extending along the passage at an oblique angle to the flow of the air-fuel mixture incident upon them whereby to at least reduce the rotary swirl of the flow in the passage, at or adjacent the outlet end of the passage a plurality of flow-distributing members located in the passage in positions angularly spaced about said central axis and spaced downstream from said guide elements, said flow-disturbing members being arranged to modify the flow pattern of the air-fuel mixture at the passage outlet.

4,930,431

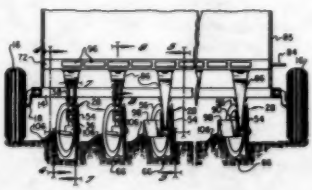
NO-TILL FIELD IMPLEMENT

Malcolm H. Alexander, Illinois Veterans Home, Quincy, Ill. 62301

Filed Jul. 10, 1989, Ser. No. 377,043

Int. Cl.[5] A01L *5/06*; A01B *5/06, 61/04*; B67D *3/00*

U.S. Cl. 111—164 **2 Claims**



1. A field implement primarily useful for Fall season prepa-

ration of agricultural land for no-till planting in the Spring season comprising:

(a) ground wheel supported frame means;

(b) hopper means mounted on top of said frame means for carrying a supply of dry, flowable fertilizer;

(c) plural apertures opening from said hopper means through which fertilizer is flowable;

(d) fertilizer flow regulating means in communication with said apertures;

(e) a plurality of like furrow opening means mounted on said frame in substantially underlying vertical alignment with selected ones of said plural apertures;

(f) each of said furrow opening means including a vertically depending shank having means for journaling a pair of rotary blades which coact for furrowing the soil as said implement traverses the ground;

(g) said shank terminating in a trunnion block having one side surface generally parallel with the line of travel of said implement and having an opposed side surface inclined to said one side surface;

(h) bosses integral with said block which respectively project normally from said one side surface and from said opposed side surface of said block and provide journaling means for said blades;

(i) said shank comprising an elongated shaft including vertically aligned upper and lower portions;

(j) said upper portion being removably secured to said frame and said lower portion having said block integrally formed therewith;

(k) compound spring means attached to said portions for resiliently maintaining adjacent ends of said portions in abutting contact and said portions in vertical alignment; and,

(l) fertilizer directing means communicating with said apertures and said flow regulating means for receiving a regulated flow of fertilizer from said hopper and for directing said regulated flow of fertilizer intermediate said blades and into furrows formed thereby.

4,930,432

BOBBIN THREAD HOLDING DEVICE FOR LOCK STITCH SEWING MACHINE CUTTER

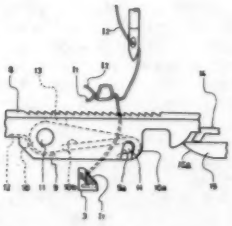
Yuji Yamamoto, Chofu, Japan, assignor to Juki Corporation, Tokyo, Japan

Filed Nov. 21, 1988, Ser. No. 274,377

Claims priority, application Japan, Nov. 30, 1987, 62-303725

Int. Cl.[5] D05B *65/02*

U.S. Cl. 112—292 **6 Claims**



1. A thread cutting device for a lockstitch sewing machine having a throat plate and bobbin, comprising:

a stationary blade positioned under the throat plate;

a movable blade for catching a needle thread and a bobbin thread to cut both threads in cooperation with said stationary blade; and

holding means positioned between said movable blade and the bobbin defining an enclosed hole for insertion of said bobbin thread therethrough and to hold the bobbin thread caught by said movable blade.

4,930,433

ARRANGEMENT FOR JOINTING TWO SURFBOARDS AS A WHOLE

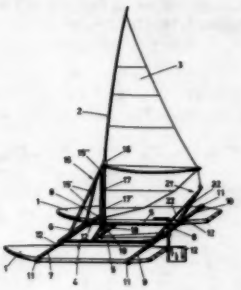
Peter Tirez, Opwijksestraat 164, 9370 Lebbeke, Belgium

Filed Dec. 11, 1987, Ser. No. 132,164

Claims priority, application Belgium, Dec. 12, 1986, PV 0/217520

Int. Cl.[5] B63B *1/00*

U.S. Cl. 114—61 **9 Claims**



1. Arrangement for jointing two surfboards as a whole including a rectangular frame (4) consisting of two small cross-girders and two small longitudinal girders (5) and (6) having the following component parts:

(a) two sets of two arms (7), (8), (9) and (10) hingedly mounted in the plane of said frame, which arms are provided at, and near their ends with means by which they can be joined to the surfboards;

(b) a hinged tripod (15) at one end of the abovesaid rectangular frame, and

(c) a hinged sailholder (21) at the other end of the same frame (4),

all this in such a way that the whole of said component parts in a folded-up state falls within the dimensions of the abovesaid frame (4).

4,930,434

SAIL REDUCING WINDER

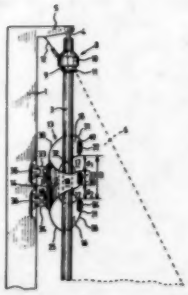
Pierre Clausin, Ville d'Avray, France, assignor to Proengin S.A., France

Filed Jan. 17, 1989, Ser. No. 298,152

Claims priority, application France, Jan. 20, 1988, 88 0593

Int. Cl.[5] B63H *9/10*

U.S. Cl. 114—106 **10 Claims**



1. Sail reducing winder, of the type in which the reduction of said sail takes place by winding the sail on a rotary tube

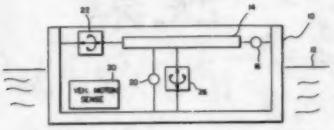
which extends parallel to the longitudinal axis of the mast, this winder comprising at least one device for holding the rotary tube in position parallel to the mast, which comprises at least two curved wings, joined together by one of their ends, by means of a connecting element able to be mounted on the mast, these two wings extending respectively on each side of the tube, so as to surround it partially and having, opposite the connecting element, two respective end edges extending parallel to the tube and defining an axial passage zone through which the sail may pass, where said wings are axially offset with respect to each other, so that said end edges are axially spaced apart from each other by a given distance.

4,930,435

ANTI-MOTION SICKNESS APPARATUS

Neil A. Newman, Omro, Wis., assignor to Brunswick Corporation, Skokie, Ill.

Filed Mar. 29, 1989, Ser. No. 330,194
Int. Cl.[5] B63B *29/12*
U.S. Cl. 114—191 **3 Claims**



1. Apparatus for use with a conveyance subject to movement;

support means adapted to support at least one person;

suspension means coupling said support means to said conveyance and permitting relative movement therebetween;

sensing means for sensing movement of said support means, said movement including a particular motion tending to cause motion sickness, said particular motion being vertically oriented and having a frequency of less than about 0.5 Hz;

means for modifying said particular motion of said support means;

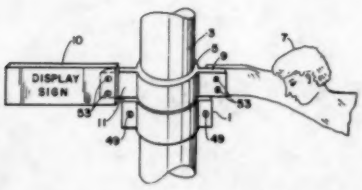
said modifying means imparting a vertical motion of higher frequency to said support means and breaking up said particular motion into sub-motions of greatly lessened tendency to cause motion sickness.

4,930,436

SELECTIVELY POSITIONABLE WEATHER VANE AND DISPLAY FOR VERTICAL POST

Joseph Newman, 32 Brookfield Way, Robbinsville, N.J. 08691

Filed Feb. 3, 1989, Ser. No. 306,622
Int. Cl.[5] G01W *1/00*
U.S. Cl. 116—264 **25 Claims**



1. A weather vane display apparatus for direct mounting at any desired position on a vertical post without requiring disassembly of the post or initiation of the mounting of said weather vane from the top or bottom of said post, comprising: a collar-like stop member adapted for rigid clamping about said vertical post directly at a desired position, said stop member having an upper edge; and

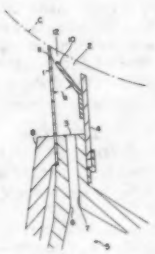
a collar-like rotatable element adapted for captive clamping around said vertical post, directly and immediately above said stop member, whereby the inside diameter of said rotatable element is greater than the outside diameter of said post at the mounting position, for permitting rotation of said rotatable element about said post and upon the upper edge of said stop member, said rotatable element including mounting bracket means having mounted thereto at least one display sign or mannequin, whereby the latter are rotated to a position in accordance with the direction of the prevailing wind at a given time, said rotatable element further including a split ring and means for selectively adjusting within a range the distance between ends of said split ring for controlling the inside diameter of said split ring.

4,930,437

COATING DEVICE FOR PAPER WEBS HAVING A COATING APPLICATION SPACE SUBDIVIDED BY A VANE

Martin Eckhard, Hunxe, Fed. Rep. of Germany, assignor to J.M. Voith GmbH, Heidenheim, Fed. Rep. of Germany

Continuation of Ser. No. 142,495, Jan. 11, 1988, abandoned. This application May 4, 1989, Ser. No. 351,283
Claims priority, application Fed. Rep. of Germany, Jan. 10, 1987, 3700569
Int. Cl.[5] B05C *3/02*
U.S. Cl. 118—410 **6 Claims**



1. In a coating device for applying a coating mixture to a running paper web supported by a backing roll, including a doctor element having a tip in close proximity to the backing roll which removes excess coating mixture, a baffle plate located on the entrance side of the paper web relative to the doctor element, a chamber having a mouth for feeding the coating mixture, and an application space defined in part by the doctor element and the baffle plate between the mouth of the chamber and the paper web, the improvement in combination therewith comprising:

said application space being subdivided by a vane into a first space and a second space, the first space being situated nearer said mouth and the second space being situated nearer said backing roll, said mouth communicating directly with said first space such that the coating mixture is fed initially into said first space, wherein said vane together with said doctor element tip defines a first gap therebetween which extends along said doctor element at least the width of said mouth in a direction parallel to said doctor element, said vane inclined in a direction toward said doctor element and toward the backing roll in the vicinity of the doctor element tip such that a tip portion of said vane is closer to the backing roll in the vicinity of the doctor element tip than a base portion of said vane, said

first gap having a width between said vane and said doctor element in the range of about 4 mm to 10 mm, said vane and said web defining a second gap therebetween having a width in the range of about 1.5 to 2.5 times the width of said first gap.

4,930,438

DEVELOPING DEVICE USING A SINGLE COMPONENT DEVELOPER

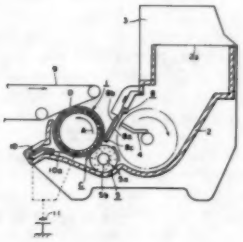
Hiromi Demizu, 2-8-19, Azamino, Midori-ku, Yokohama-shi, Kanagawa-ken; Makoto Obu, 7-1-7-106, Minami-kasai, Edogawa-ku, Tokyo; Hidetoshi Yano, Lion's Dai-3-Fujigaoka #506, 1-8-14, Fujigaoka, Midori-ku, Yokohama-shi, Kanagawa-ken; Ryubun Seimiya, 7-16-7, Tamadaira, Hino-shi, Tokyo, and Noriyoshi Tarumi, Nanyodai 47-1, 168-38, Shimoyugi, Hachioji-shi, Tokyo, all of Japan

Continuation of Ser. No. 760,404, Jul. 30, 1985, abandoned. This application Oct. 21, 1987, Ser. No. 113,331

Claims priority, application Japan, Aug. 7, 1984, 59-164247; Aug. 8, 1984, 59-120909; Aug. 8, 1984, 59-164800; Aug. 8, 1984, 59-164801; Aug. 8, 1984, 59-164802; Aug. 10, 1984, 59-166545

Int. Cl.[5] G03G *15/08*

U.S. Cl. 118—651 26 Claims



1. A device for developing an electrostatic latent image by applying a thin film of developer formed on an image bearing member comprising:

storing means for storing therein a quantity of one-component developer, said storing means having an outlet port at a predetermined location;

transporting means for transporting said developer along a predetermined path through a developing region where said developer is applied to said image bearing member to develop said latent image; and

supplying means including a cylindrical support and a flexible layer formed on said cylindrical support, said supplying means being disposed in the vicinity of said outlet port of said storing means for receiving said developer from said storing means to be supplied to said transporting means, said supplying means being supported to be rotatable and driven to rotate in a first predetermined direction so as to be in sliding contact with said transporting means and to thereby cause said developer to be formed into a thin film of charged developer on said transporting means; and

wherein said transporting means includes a developing sleeve comprised of a cylindrical support, an intermediate layer formed on said support and an electrode layer formed on said intermediate layer, said electrode layer being comprised of a dielectric material with a plurality of fine electrode particles dispersed therein and separated from one another, and said sleeve being rotatably supported and driven to rotate in a second predetermined direction.

4,930,439

MASK-REPAIRING DEVICE

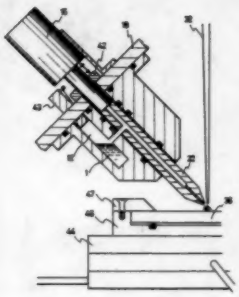
Mitsuyoshi Sato; Takashi Kaito, and Yoshitomo Nakagawa, all of Tokyo, Japan, assignors to Seiko Instruments Inc., Japan

Continuation of Ser. No. 845,135, Feb. 25, 1986, abandoned. This application Aug. 2, 1988, Ser. No. 227,469

Claims priority, application Japan, Jun. 26, 1984, 59-131720; Nov. 5, 1984, 59-232853; Nov. 13, 1984, 59-171789

Int. Cl.[5] C23C *16/04*

U.S. Cl. 118—723 19 Claims



1. An apparatus for treating a sample comprising: means for irradiating a designated area of a sample with a focused ion beam; and means for producing and directing a vapor stream of compound onto the designated area of the sample, the means for producing and directing comprising a vessel for storing compound to be vaporized, heating means for heating the compound to vaporize the same inside the vessel to produce compound vapor, a nozzle in fluid communication with the inside of the vessel for receiving the compound vapor and directing the same in the form of a vapor stream onto the designated area of the sample, and valving means disposed along the fluid communication path between the vessel and nozzle and having a closed state for blocking the flow of compound vapor through the nozzle and an open state for permitting the flow of compound vapor through the nozzle, the valving means including a tubular member extending upwardly from the bottom of the vessel and terminating at its upper end in a valve seat in the upper region of the vessel and communication at its lower end with a nozzle, a movable valve member movable to a closed position wherein the valve member seats on the valve seat thereby defining the closed state and movable to an open position wherein the valve member is spaced from the valve seat so that compound vapor can flow from the vessel through the tubular member to the nozzle thereby defining the open state, and actuating means for actuating the valve member to the open and closed positions.

4,930,440

COATER GAP CONTROL ARRANGEMENT

Hiroshi Shirono, Habikino, Japan, assignor to Chugai Ro Co., Ltd., Osaka, Japan

Filed Jul. 19, 1989, Ser. No. 383,151

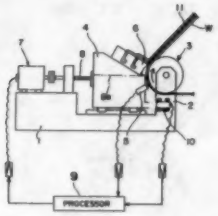
Int. Cl.[5] B05C *1/04*

U.S. Cl. 118—663 5 Claims

1. In a coater for coating a surface of a workpiece with coating material, which is provided with a base, a back-up roll rotatably mounted on one end portion of the base for transporting the workpiece, a coater body slidably mounted on the base and a coater head securely mounted on the coater body for supplying the coating material onto the surface of the workpiece, a coater gap control arrangement comprising:

a position control means securely mounted on the base for moving the coater body back and forth with respect to the back-up roll to control a position of the coater body;

a distance measuring means securely mounted on the coater body for measuring a distance up to the surface of the workpiece, said distance measuring means confronting the back-up roll and forming a predetermined angle with respect to a straight line which passes a center of rotation of the back-up roll and along which the coater body can



move, said predetermined angle being identical with an angle formed between the coater head and said straight line; and

a processor for controlling said position control means on the basis of a signal from said distance measuring means so that a predetermined distance is kept at all times between the coater head and the workpiece.

4,930,441

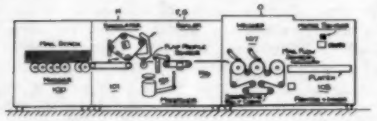
VERIFICATION OF OPERABILITY OF MOISTENER

Robert J. Tolmie, Jr., Brookfield, Conn., assignor to Pitney Bowes Inc., Stamford, Conn.

Filed Dec. 28, 1988, Ser. No. 291,095

Int. Cl.[5] B05B *3/14, 12/12, 15/10*

U.S. Cl. 118—669 **4 Claims**



1. In a moistening apparatus for moistening a flap of an envelope, the flap moving in a first direction in a given plane, said apparatus having a nozzle directed to spray a liquid at the envelope flap along a given locus in said plane, means for moving the nozzle between first and second positions, a source of first signals that are a function of the width of said flap, means responsive to said first signals for moving said nozzle in a direction substantially parallel to said plane for moistening said flap at determined positions thereof, and means for applying said liquid to said nozzle; the improvement comprising means for controlling said liquid applying means, and a sensor fixedly positioned at the first position to detect the presence of liquid emitted from said nozzle, when said nozzle is in said first position, said control means comprising means for controlling said liquid applying means to direct liquid to said nozzle at the second position while an envelope is adjacent thereto, and means for momentarily directing liquid to said nozzle prior to movement of said nozzle to the second position for providing an indication of operability of said nozzle and liquid applying means.

4,930,442

MICROWAVE PLASMA CVD APPARATUS HAVING AN IMPROVED MICROWAVE TRANSMISSIVE WINDOW

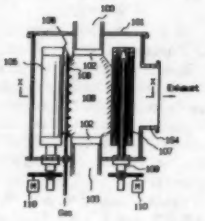
Shigehira Iida; Takayoshi Arai; Junichiro Hashizume; Tetsuya Takei, all of Ueno, and Keishi Saitoh, Nabari, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 25, 1988, Ser. No. 173,605

Claims priority, application Japan, Mar. 27, 1987, 62-73560

Int. Cl.[5] C23C *16/50*

U.S. Cl. 118—723 **3 Claims**



1. An apparatus for the formation of a functional silicon-containing deposited film on a plurality of cylindrical substrate by means of a microwave plasma chemical vapor deposition process conducted in a substantially enclosed deposition chamber, said deposition chamber being cylindrical and comprising a circumferential wall having an end portion thereof hermetically provided with a microwave introducing window to which a waveguide extending from a microwave power source is connected, said microwave introducing window being formed of an alumina ceramic consisting of α-alumina and from 1 to 8 wt.% of one or more glassy component selected from the group consisting of SiO_2, CaO, and MgO, said cylindrical deposition chamber having a discharge space with a plurality of rotatable cylindrical substrate holders circumferentially positioned around a longitudinal axis of said discharge space, each rotatable cylindrical substrate holder provided with an electric heater therein, each said rotatable cylindrical substrate holder capable of having mounted thereon one of said cylindrical substrates, said rotatable cylindrical substrate holders being arranged at intervals said cylindrical deposition chamber also being provided with a plurality of gas feed pipes for supplying a film-forming raw material gas into said discharge space and means for evacuating said cylindrical deposition chamber, each said gas feed pipe being arranged between two of said rotatable cylindrical substrate holders so as to permit the film-forming raw material gas to be supplied into said discharge space.

4,930,443

ANIMAL LITTER COMPOSITION

H. Edward Lowe, Jr., 21525 Allegheny St., Cassopolis, Mich. 49031, and Marvin L. Raymond, Cape Girardeau, Mo., assignors to H. Edward Lowe, Jr., Cassopolis, Mich.

Filed Dec. 9, 1988, Ser. No. 281,648

Int. Cl.[5] A01K *1/015*

U.S. Cl. 119—1 **8 Claims**

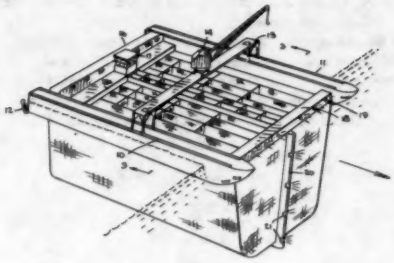
1. Animal litter comprising a quantity of absorbent granular materials, said granular materials including a biocidal additive incorporated therein, said additive constituting means for inhibiting microbial growth in said granular materials, said additive consisting of an aqueous solution of a complex ion consisting of an organic compound and a biocidal compound, said aqueous solution applied directly to the litter.

4,930,444

APPARATUS AND METHOD OF FISHING FOR SWIMMING FISH

Vincent R. Vasile, One Carriage Rd., Roslyn, N.Y. 11576

Filed Sep. 26, 1988, Ser. No. 249,403
Int. Cl.[5] A01K *63/00*
U.S. Cl. 119—3 11 Claims



1. A method of fishing for swimming fish while nourishing the fish with sea water containing plankton comprising:

disposing swimming fish eggs in trays having openings for holding said eggs;

feeding fresh sea water containing plankton through said trays until said eggs are at least partially hatched whereupon freshly hatched swimming fish pass through said openings with the flow of sea water;

connecting said trays with first compartments for freshly hatched swimming fish for feeding sea water and swimming fish thereto;

connecting said first compartments for feeding sea water and larger swimming fish to a compartment of a net having a mesh sufficiently fine to contain said larger swimming fish and to prevent larger fish from entering said net compartment;

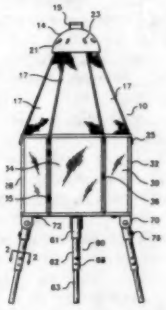
submerging said net compartment under sea water and suspending said net compartment on a floating, movable object which can relocate the net compartment to an area of fresh sea water containing plankton when desired.

4,930,445

PORTABLE PET HOUSE

Joseph C. Chestnut, 4601 Lyric La., San Diego, Calif. 92117

Filed Nov. 17, 1988, Ser. No. 272,317
Int. Cl.[5] A01K *1/00, 31/08*
U.S. Cl. 119—19 8 Claims



1. A portable pet house comprising:

a plurality of rectangularly shaped side wall panels each having a frame around their periphery, said frames when in their erected position forming a closed side wall construction;

a horizontally oriented base plate having a predetermined peripheral contour and also a bottom surface, said base plate having a relatively short height wall that extends upwardly around its periphery, said base plate having a top surface having a channel spaced inwardly from its periphery that extends around the peripheral edge of said base plate for removably receiving the bottom edge of said side wall panel frames;

means for securing the side wall panel frames in the channels on the top surface of said base plate;

at least three telescoping legs assemblies;

each of said leg assemblies have a plurality of tubular members that telescopically retract within one another, one of said tubular members being pivotally secured to a ratchet hinge that is attached to the bottom surface of said base plate so that said leg assemblies may be folded inwardly under said bottom surface toward each other when the portable pet house is in its traveling mode, a stopper for each leg assembly mounted on the bottom surface of said base plate to limit the extent to which the leg assemblies may be pivoted toward the bottom surface of said base plate, a foot rest pad is mounted on the lateral surface of each of said leg assemblies to provide a support surface for the portable pet house when it is in its folded position; and

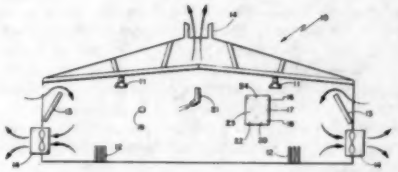
a cover for the top area of the frames of said side wall panels, a handle is secured to said cover.

4,930,446

METHODS FOR CONTROLLING POULTRY BARN ENVIRONMENTS

Richard D. Huisinga, Willmar, Minn., assignor to Willmar Poultry Company, Inc., Willmar, Minn.

Continuation of Ser. No. 19,032, Feb. 26, 1987. This application Aug. 4, 1988, Ser. No. 228,390
Int. Cl.[5] A01K *31/20*
U.S. Cl. 119—21 39 Claims



39. A method for controlling the environment within the interior of a poultry barn for domestic fowl raised for flesh comprising the steps of:

(a) illuminating the poultry barn environment on a cyclical basis repeated a multiplicity of times each day,

(b) purging air from the poultry barn environment on a cyclical basis, said purging cycle comprising at least one purging phase and at least one normal phase, each said phase comprising a frequency, an intensity and a length, said purging cycles being coordinated with the illuminating cycles and at least one said purging phase occurring in an unillumination phase to purge the barn of dust when the domestic fowl are inactive;

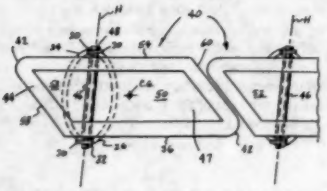
(c) fluctuating the temperature of the poultry barn environment on a cyclical basis, said fluctuating being effectuated in part by purging air from the poultry barn to lower the temperature, said fluctuating cycle comprising at least one target phase and at least one colder phase, each said phase comprising a frequency, an intensity and a length, said fluctuating cycles being coordinated with the illuminating

cycles and said colder phase occurring in an illumination phase to stimulate feeding by the domestic fowl,

(d) sprinkling the poultry barn environment on a cyclical basis, said sprinkling cycle comprising at least one wet phase and at least one dry phase, each said phase comprising a frequency, an intensity and a length, said sprinkling cycles being coordinated with the illuminating cycles and said wet phase occurring in said illumination phase to remove dust from the air and to wet the poultry barn environment for an active stage of the domestic fowl; and

(e) adjusting said frequencies, said intensities, and said lengths of said phases of said illuminating, purging, fluctuating and sprinkling cycles with each other.

4,930,447
DIVIDER GATE FOR PARALLEL DAIRY PARLOR
Steve N. Pescock, P.O. Box 1206, Anthony, N. Mex. 88021
Filed Aug. 15, 1988, Ser. No. 232,404
Int. Cl.[5] A01K *1/12*
U.S. Cl. 119—27 **8 Claims**



1. In a parallel dairy stall arrangement comprising a series of stalls separated by dividers, each stall having an entry gate at its mouth, each entry gate being mounted on a respective one of said dividers on hinges forming a hinge axis, each entry gate being movable about said axis between closed and open positions, and with the entry gates being situated in a common substantially vertical plane in the closed position, a substantial portion of the entry gate lying on either lateral side of the hinge axis, so that when closed, a major portion of the gate extends partially across the mouth of a neighboring stall, the improvement wherein said gate comprising a panel defined by top and bottom edges and first and second lateral edges, with the effective width of said gate being greater than the width of the stall and one lateral edge overlapping a lateral edge of an adjacent gate.

4,930,448
ANIMAL TOY
Randall W. Robinson, 2165 Paradise Dr., Tiburon, Calif. 94920
Filed Jun. 26, 1989, Ser. No. 371,061
Int. Cl.[5] A01K *15/02*
U.S. Cl. 119—29 **12 Claims**

1. A toy device for the amusement of pet animals, comprising:

a base member having a lower surface for freely seating on a substantially flat surface, the lower surface having no projections for connection to the seating surface;

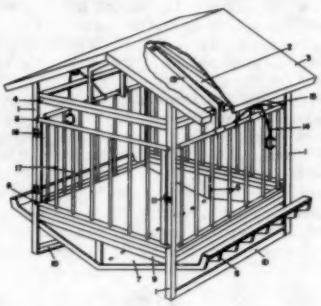
an elongate, rod-like member rotatably mounted at one end on said base member and extending in an upwardly and radially outwardly arched path away from said base member with its free end spaced radially outwardly from the outer periphery of said base member;

a single flexible connecting device secured to the free end of said elongate member;

an object attached to said connecting device opposite and directly below the free end of said member; and

drive means on said base member for rotating said elongate member to move said object in a path around said base for the amusement of a pet unsecured to said base.

4,930,449
PORTABLE HAY FEEDER
Shelby H. Harton, Star Rte. Box 128, Rosansky, Tex. 78952
Continuation-in-part of Ser. No. 137,609, Dec. 24, 1987, abandoned. This application Oct. 17, 1988, Ser. No. 258,727
Int. Cl.[5] B60Q *5/00*
U.S. Cl. 119—60 **9 Claims**



1. A portable hay feeder comprising:

a. a rectangular structure with support posts at each corner attached between a sloping roof and a V shaped floor;

b. end wall gates, made of vertical bars which are spaced a minimum of 2" apart, between said sloping roof and said V shaped floor of said rectangular structure with a horizontal bar across an opening formed when said end wall gates are in an open position, said horizontal bars acting to hold material from being slideably removed from said rectangular structure;

c. means for pivotally fastening said end wall gates to said rectangular structure;

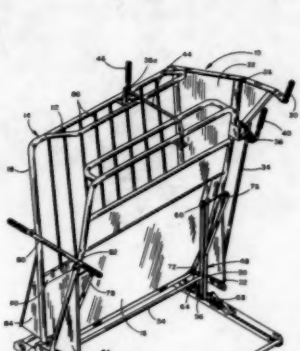
d. two side gates, made with vertical bars a minimum of two inches apart, said side gates being pivotally connected at the top of each of said side gates to a minimum of two angle support brackets that are in turn pivotally connected to a re-enforcing structure beneath said sloping roof of said rectangular structure in such manner that a first biasing means may pull said side gates apart with said side gates hanging in a vertical position; removal of said first biasing means allows a second biasing means to move each of said side gates toward a center of said rectangular structure while removal of said second biasing means will allow said side gates to move outward from said center.

4,930,450

LIVESTOCK HANDLING DEVICE

William D. Priefert, Mt. Pleasant, Tex., assignor to Priefert Mfg. Co., Inc., Mt. Pleasant, Tex.

Filed Feb. 1, 1989, Ser. No. 304,465
Int. Cl.[5] A61D 3/00
U.S. Cl. 119—103 11 Claims



1. An animal handling device comprising:

(a) a ground supported base frame;

(b) an animal restraining chute having a flat first side member and a second opposite side member movable relative to said first side member into and out of an animal restraining position;

(c) an upright lever assembly pivotally mounting said chute for pivotal movement on said base frame from a substantially upright position for said first side member to a horizontally inclined animal operational position thereof to form a table for supporting an animal on its side for operational access through said second side member;

(d) said lever assembly extended between and pivotally connected to said base frame and to said first side member at a position intermediate the upper and lower ends of said first side member;

(e) coacting means on said lever assembly and base frame for limiting pivotal movement of the lever assembly in one direction relative to the base frame to an animal receiving position of the chute, and in an opposite direction to an animal shift position wherein the weight of the animal acts to assist the movement of the chute to the inclined position of the first side member;

(f) said chute, with the lever assembly in the animal shift position being pivotally moved relative to the upper end of the lever assembly to the inclined position of the first side member;

(g) means for releasably locking said second side member in an animal restraining position prior to pivotal movement of said chute to said animal shift position, and

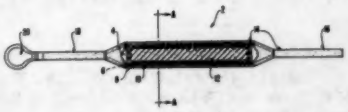
(h) coacting means on said first side member and lever assembly for defining said horizontally inclined position of the first side member.

4,930,451

DEVICE FOR SUSTAINED-RELEASE OF A CHEMICAL ONTO AN ANIMAL AND METHOD OF USING THE DEVICE

John A. Miller, and Delbert D. Oehler, both of Kerrville, Tex., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Jul. 29, 1988, Ser. No. 226,057
Int. Cl.[5] A01K 27/00, 13/00
U.S. Cl. 119—106 12 Claims



1. A device for the controlled, sustained-release of an animal-treating composition onto a surface in contact with said device, wherein the device comprises:

reservoir means having an inside surface and an outside surface, wherein said reservoir means is comprised of a permeable, imperforate, polymeric membrane;

a porous packing means in said reservoir means for continuously wetting the inside surface of said reservoir means with said animal-treating composition so that said composition can continuously permeate through said membrane to the outer surface of said reservoir means; and

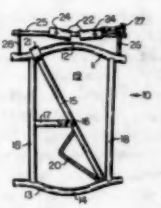
a porous sheath means in contact with the outer surface of said reservoir means for continuously conducting away by capillary action the composition that permeates through said membrane to the outer surface of the reservoir means and for continuously depositing said composition onto said surface.

4,930,452

CATTLE STANCHION

John A. DaSilveira, 25251 E. Mariposa Rd., Escalon, Calif. 95320

Filed Aug. 1989, Ser. No. 396,102
Int. Cl.[5] A01K 1/00
U.S. Cl. 119—148 9 Claims



1. A self-locking and manually unlocking cattle stanchion comprising an essentially coplanar frame of connecting vertical and horizontal bars for automatically admitting and releasably restraining the necks of cattle, said stanchion frame consisting of attachable single frame units of three vertical bars and two essentially horizontal bars, the top of said horizontal bars being slightly arched upward to form an apex over the center of the frame and the bottom of said horizontal bars being slightly arched downwardly to form a nadir under the center of the frame, said top and bottom arches defining an arc of travel for a centrally mounted vertical bar to pivot laterally within the plane of the frame between said stationary vertical bars, said frame cooperating with a locking mechanism comprising in combination an upper linear horizontal locking bar with a pair of elliptical latching sleeves spaced apart coaxially

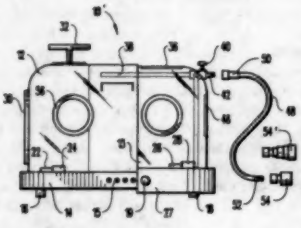
on said locking bar to define a notch above said upper arch of said frame but pivotally mounted thereon by a pin through each minor axes and distal from the apex of said frame so as to cause the major axes of said pair of elliptical latching sleeves to project downwardly by gravity and thusly trap and latch an upper end of said central pivotally mounted vertical bar in said frame when said locking bar is in the locked position, but also releasing said central pivotal bar and the cattle therefrom when said locking bar is manually rotated in an opposite direction thus causing the major axes of said elliptical latching sleeves to project perpendicularly to the plane of said frame.

4,930,453

SMALL ANIMAL WASHING DEVICE

David R. Laliberte, 1370 Lakeshore Rd., Box 20, Haileybury, Ontario, Canada P0J-1K0

Filed Dec. 14, 1988, Ser. No. 284,941
Int. Cl.[5] A01K *29/00*; A61G *11/00*
U.S. Cl. 119—158 **1 Claim**



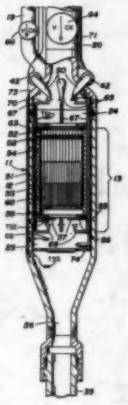
1. A small animal washing device, comprising:
a base;
a floor of said base sloping toward a drain;
a screen covering said drain for trapping loose animal hair;
a grate overlying said floor for supporting an animal;
a dome formed from a transparent material;
said base and said dome each including a pair of telescoping sections for adjusting the length of said base and said dome to accommodate various different sizes of animals;
latch means for securing said dome on said base, said latch means including a plurality of blocks formed on exterior surfaces of said dome and a plurality of channel shaped fasteners slidably mounted on said base for selective frictional engagement with said blocks;
an opening formed in one end of said dome dimensioned to receive a small animal's head;
a rubber sheet covering said opening and having a slit to receive an animal's head in sealing relation;
a plurality of circular apertures in said dome;
each of said circular apertures in said dome having a surrounding reduced diameter retaining plate disposed on an inner surface of said dome;
each of said circular apertures having a radially extending surrounding lip and an adjacent undercut groove;
a pair of glove inserts for selective mounting in two of said circular apertures;
a plurality of cover plates for closing said circular apertures;
each of said glove inserts and each of said cover plates including a resilient sealing disc dimensioned for sealing engagement in said grooves of said circular apertures;
a water conduit within said dome communicating with an external water supply;
spray means connected to said water conduit for spraying water on an animal in said dome;
valve means for controlling said spray means; and
a carrying handle on said dome.

4,930,454

STEAM GENERATING SYSTEM

James A. Latty, San Juan Capistrano, and Spencer Eisenbarth, Costa Mesa, both of Calif., assignors to Dresser Industries, Inc., Dallas, Tex.

Filed Aug. 14, 1981, Ser. No. 292,761
Int. Cl.[5] F22B *1/00*
U.S. Cl. 122—4 D **80 Claims**



1. A combustor including means for catalytically combusting a fuel admixture of a non-combustible diluent and a carbonaceous fuel intimately mixed in a thermally self-extinguishing mass ratio so such combustion directly heats said diluent to produce a heated fluid, means for providing relative quantities of said carbonaceous fuel and an oxidant for such combustion, said means for catalytically combusting comprising a housing with an inlet chamber toward one end thereof and a discharge chamber toward the other end thereof, a catalyst supported within said housing between said chambers, means for mixing said admixture and said oxidant in said inlet chamber to form an inlet mixture preparatory to flow through said catalyst, a post-combustion injector for spraying a non-combustible cooling fluid with a high heat capacity into said heated fluid for cooling purpose, a cooling fluid control, a temperature sensor for said heated fluid for detecting the temperature thereof prior to injection of said cooling fluid, control means connected between said sensor and said flow control for transmitting a control signal to said control-fluid flow control to cause said flow control to adjust the flow of said cooling fluid into said discharge chamber for lowering the temperature of said working fluid to a selected temperature, and a post-injection temperature sensor for detecting the temperature of said heated fluid after injection of said cooling fluid, said control means being connected with said latter sensor and including a computer for comparing said post-injection temperature to said selected temperature and transmitting an appropriate signal to said cooling fluid flow control to adjust the flow of said cooling fluid to cool said working fluid to said selected temperature.

4,930,455

CONTROLLING ENGINE COOLANT FLOW AND VALVE ASSEMBLY THEREFOR

Brian T. Creed, and Cyril E. Bradshaw, both of Wheaton, Ill., assignors to Eaton Corporation, Cleveland, Ohio

Continuation of Ser. No. 882,665, Jul. 7, 1986, abandoned. This application Oct. 14, 1988, Ser. No. 258,098
Int. Cl.[5] F01P *7/14*
U.S. Cl. 123—41.1 **20 Claims**

1. A method of controlling coolant for through the heat

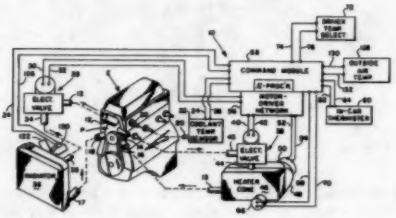
exchanger circuit of an internal combustion engine comprising the steps of:

(a) channeling coolant flow from the engine through a valving passage to the coolant heat exchanger;

(b) providing a valve in said passage;

(c) sensing the coolant temperature in said engine;

(d) opening said valve upon cold engine start-up to permit



substantially full flow therethrough for a brief interval comprising a small fraction of the engine warm-up period, for cleaning foreign particles from the valve seating surfaces, and returning said valve to a partially open position for continued warm-up; and,

(e) modulating the position of said valve responsive to changes in said sensed temperature for controlling coolant flow to maintain normal engine operating temperature.

4,930,456

PERFECTED FEEDING DEVICES FOR INTERNAL COMBUSTION ENGINES

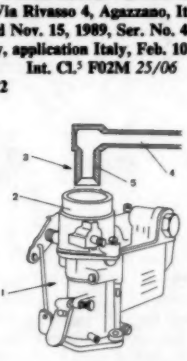
Cesare Schiavi, Via Rivasso 4, Agazzano, Italy

Filed Nov. 15, 1989, Ser. No. 436,903

Claims priority, application Italy, Feb. 10, 1989, 44803 A/89

Int. Cl.[5] F02M *25/06*

U.S. Cl. 123—572 **4 Claims**



1. A fuel injection device designed for internal combustion engines

having a carburetor with an inlet manifold, the inlet manifold having a central axis

wherein means are provided for directing a flow of oil saturated air developed in an oil sump to the carburetor inlet manifold, wherein said means comprise a nozzle connected between the oil sump of the internal combustion engine and the carburetor inlet manifold; the axis of said nozzle being coincident with the central axis of the carburetor inlet manifold.

4,930,457

TEMPERATURE-OPERATED FLUID FRICTION COUPLING

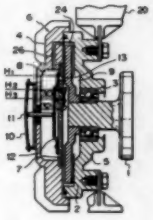
Kunio Tamai, Numazu, Japan, assignor to Usui Kokusai Sangyo Kaisha Ltd., Shizuoka, Japan

Filed Dec. 12, 1988, Ser. No. 284,061

Claims priority, application Japan, Dec. 28, 1987, 62-197347[U]

Int. Cl.[5] F16D *43/25*

U.S. Cl. 123—41.12 **6 Claims**



1. A temperature operated fluid friction coupling for intermittently driving a cooling fan of an internal combustion engine, the internal combustion engine having a drive input shaft, and said coupling comprising:

a housing defining an interior space provided so as to be rotatably supportable on the input drive shaft for supporting the cooling fan of the internal combustion engine;

a rotor fixable on the drive input shaft and disposed in said interior space of said housing so as to define shearing surface gaps between itself and said housing;

a partition for dividing said interior space of said housing into a fluid reservoir and a torque transmitting chamber, said rotor being located in said torque transmitting chamber adjacent said partition;

first valve means for supplying fluid to said rotor in said torque transmitting chamber from said reservoir at a predetermined, relatively high ambient temperature, said first valve means including a first valve opening in said partition between said reservoir and said chamber, a valve member supported on said partition for opening and closing said valve opening, a bimetallic element disposed outside of said housing, and an actuating pin extending through said housing, an outer end of said actuating pin abutting with said bimetallic element and the inner end of said pin abutting with said valve member, wherein said bimetallic element is adopted to curve at said predetermined relatively high temperature; and

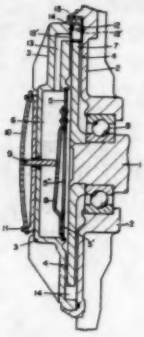
second valve means for supplying fluid to said rotor in said torque transmitting chamber from said reservoir at a second predetermined temperature lower than said high ambient temperature, said second valve means including a second valve opening in said partition between said reservoir and said chamber and a second valve member on said partition made of a temperature-sensitive material for opening and closing said second valve opening, wherein said second valve member is adapted to curve at said second predetermined temperature to enable said second valve opening to be opened and closed.

4,930,458

THERMOSENSITIVE HYDRAULIC FAN COUPLING

Kazunori Takikawa, and Yuichi Ono, both of Numazu, Japan, assignors to Usui Kokusai Sangyo Kaisha Ltd., Shizuoka, Japan

Filed Jun. 21, 1989, Ser. No. 369,308
Claims priority, application Japan, Jun. 24, 1988, 63-156282
Int. Cl.[5] F01P 7/02
U.S. Cl. 123—41.12 6 Claims



1. In a thermosensitive hydraulic fan coupling comprising: a sealed box defined by a cover and a casing, said cover being supported, through a bearing, by a rotary shaft having a drive disk at one end thereof and a cooling fan attached to the outer periphery thereof; a partition plate having an oil flow adjusting hole and dividing said sealed box into an oil chamber and a torque transmission chamber housing said drive disk therein and providing therein an idle oil chamber in opposite relationship with the outer periphery of said drive disk; a dam provided at a part of the inner peripheral surface of said sealed box facing the outer periphery of said drive disk around which oil collects at the time of rotation of said disk; an oil circulation passage having an inlet port and an outlet port and adapted to establish communication between said torque transmission chamber and said oil chamber; and a valve means operative in response to a deformation of a thermosensitive member formed on the front face of said cover so that when the ambient temperature exceeds a predetermined value to deform said thermosensitive member, the valve means opens the oil flow adjusting hole of said partition plate while when the ambient temperature drops below said predetermined value, it closes said oil flow adjusting hole, whereby a torque is transmitted from said rotary shaft to said sealed box due to a change in the contact area of the oil in a torque transmission gap formed between opposing surfaces of said drive disk and said casing and cover, THE IMPROVEMENT characterized in that said dam comprises a platelike rocking strip provided within said idle oil chamber at a position near the inlet port of said circulation passage so as to be forwardly of said circulation passage in a rotational direction of the disk and serves as an opening and closing mechanism for said circulation passage with the aid of a predetermined centrifugal force applied on the platelike rocking strip.

4,930,459

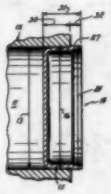
FREEZE PLUG

Norman D. Coffenberry, Washington Court House, Ohio, assignor to SDI Operating Partners, L.P., Del.

Filed Jul. 21, 1989, Ser. No. 383,866
Int. Cl.[5] F01P 5/14
U.S. Cl. 123—41.15 5 Claims

1. A method of installing a freeze plug in a coolant hole for an engine block, said method comprising the steps of

providing a cup-shaped freeze plug having a base section of a minor outside diameter which is less than the nominal diameter of said hole, and a rim section of a major outside diameter which is greater than the nominal diameter of said hole,



preliminarily fitting said freeze plug's base section into said hole by hand in a non-sealing position in order to properly orient and locate said freeze plug in said hole, and

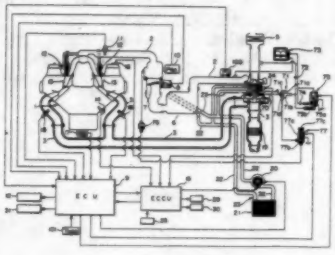
thereafter force fitting said freeze plug's rim section into said hole by driving said rim section into a coolant sealing position therein.

4,930,460

ENGINE ROOM-COOLING CONTROL SYSTEM

Yasuyuki Aihara; Shigeki Baba; Eitetsu Akiyama, and Tatsumi Sawada, all of Wako, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 23, 1988, Ser. No. 289,371
Claims priority, application Japan, Dec. 28, 1987, 62-199409[U]; Dec. 28, 1987, 62-332922; Aug. 1, 1988, 63-193166; Aug. 1, 1988, 63-193167
Int. Cl.[5] F01P 7/10
U.S. Cl. 723—41.49 17 Claims



1. A control system for controlling the cooling of an engine room accommodating an engine, comprising:

first detecting means for detecting stoppage of said engine;

cooling fan means arranged in said engine room for cooling same, said cooling fan means comprising a first cooling fan arranged at a first location in said engine room for cooling said engine, and a second cooling fan arranged at a second location in said engine room;

second detecting means for detecting a temperature of said engine; and

control means for operating said cooling fan means when said first detecting means has detected the stoppage of said engine and at the same time the temperature of said engine detected by said second detecting means is higher than a predetermined value, in a manner such that said control means causes one of said first and second cooling fans to be driven for rotation in a direction such that air is discharged from said engine room to the outside thereof, and the other of said first and second cooling fans in a direc-

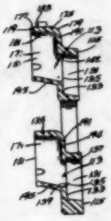
tion such that air is introduced into said engine room from the outside thereof.

4,930,461

ONE-PIECE LOST FOAM PATTERN FOR AN INTAKE MANIFOLD

Don B. McNamara, Menomonee Falls, Wis., assignor to Outboard Marine Corporation, Waukegan, Ill.

Filed Aug. 4, 1989, Ser. No. 389,864
Int. Cl.[5] F02M *35/10*
U.S. Cl. 123—52 M **8 Claims**



1. A one-piece foam pattern for an intake manifold for a two cycle internal combustion engine, said pattern comprising a first surface for providing an intake manifold surface adapted to engage an engine block surface and having therein a first opening, a second surface extending in generally spaced relation to said first surface and for providing an intake manifold surface adapted to engage a carburetor mounting surface, said second surface having therein a generally cylindrical opening, and a passage extending between said first and second surfaces and adapted to provide a fuel/air mixture passage in said intake manifold, said passage including a first portion extending from said first opening in said first surface and having a first transverse surface extending in spaced relation to said first and second surfaces and having therein a second opening, said passage also including a transition portion extending between said circular opening in said second surface and said second opening and being defined by semi-cylindrical wall means extending from said circular opening in said second surface and including a first axial end at said second surface and a second axial end spaced from said first end, second wall means extending from said second end of said semi-cylindrical wall means to said second opening and defining a second transverse wall generally parallel to said second surface, and third wall means extending from said circular opening and diverging to said second opening.

4,930,462

SEPARATED LUBRICATION TYPE TWO-CYCLE INTERNAL COMBUSTION ENGINE SYSTEM

Yoshikiyo Kamata, Hachioji, Japan, assignor to Kioritz Corporation, Tokyo, Japan

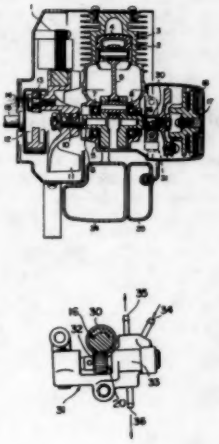
Filed Jun. 6, 1989, Ser. No. 361,886
Claims priority, application Japan, Jul. 1, 1988, 63-87494[U]
Int. Cl.[5] F02B *33/04*
U.S. Cl. 123—73 AD **1 Claim**

1. A separated lubrication type two-cycle internal combustion engine system comprising:

an internal combustion engine having a crankshaft;

a lubricating oil tank;

a lubricating oil pump capable of discharging lubricating oil at a rate higher than the rate at which said internal combustion engine needs to be lubricated, said lubricating oil pump being disposed in the vicinity of one of projecting ends of said crankshaft, said lubricating oil pump having an inlet and a pair of outlets, said inlet communicating with said lubricating oil tank, one of said pair of outlets communicating with the interior of said internal combustion engine, the other of said outlets communicating with said lubricating oil tank; and



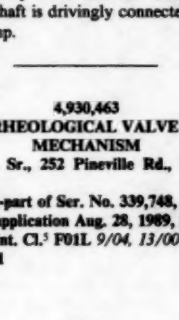
a drive member disposed at said one of said projecting ends of said crankshaft is drivingly connected with said lubricating oil pump.

4,930,463

ELECTRO-RHEOLOGICAL VALVE CONTROL MECHANISM

Nicholas S. Hare, Sr., 252 Pineville Rd., Monroeville, Ala. 36460

Continuation-in-part of Ser. No. 339,748, Apr. 18, 1989, abandoned. This application Aug. 28, 1989, Ser. No. 399,178
Int. Cl.[5] F01L *9/04, 13/00*
U.S. Cl. 123—90.11 **28 Claims**



1. An electro-rheological valve controller comprising:

a generally cylindrical casing holding an electro-rheological fluid;

a reciprocating tappet attached at one end of the cylindrical casing, said tappet contacting cam means for thrusting said tappet into said casing toward a reciprocating valve lift member;

a plunger member coupled to said tappet, said plunger being perforated to permit the flow of electro-rheological fluid therethrough;

a reciprocating valve lift member situated within said casing and separated from said perforated plunger member by

said electro-rheological fluid, said lift member communicating with a valve to be lifted; and

electrode means coupled to said perforated plunger member for generating an electric field within said perforated plunger member such that said electro-rheological fluid within said perforated plunger member solidifies, whereby said plunger applies a compressive fluid force against said reciprocating lift member thereby lifting said valve to be lifted.

4,930,464

HYDRAULICALLY OPERATING ACTUATING DEVICE FOR A LIFT VALVE

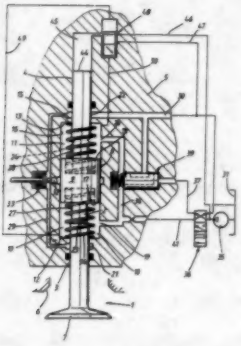
Ulrich Letsche, Stuttgart, Fed. Rep. of Germany, assignor to Daimler-Benz AG, Stuttgard, Fed. Rep. of Germany

Filed Sep. 27, 1989, Ser. No. 413,212

Claims priority, application Fed. Rep. of Germany, Oct. 28, 1988, 3836725

Int. Cl.[5] F01L *9/02*

U.S. Cl. 123—90.12 **7 Claims**



1. Hydraulically acting actuating device for a lift valve, in particular, in an internal combustion engine, having a piston which is connected to a valve stem, said piston is guided in a cylinder and stressed on both sides by working fluid and divides two stroke spaces which are both connectable, via respective openings in a wall the cylinder which can be occluded by piston covering the openings, to a pressure source for pressurizing the working fluid and to a reservoir, wherein the respective openings, which in a central actuation range of the piston each communicate with an associated one of said stroke spaces, are connected to one another directly by a connecting line and wherein springs, which act in opposite directions and hold the piston in a central position in said central actuation range relative to two end positions when in equilibrium, engage on at least one of the piston and a cylinder end wall.

4,930,465

SOLENOID CONTROL OF ENGINE VALVES WITH ACCUMULATOR PRESSURE RECOVERY

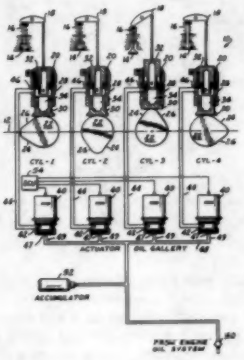
Russell J. Wakeman, and Stephen F. Shea, both of Newport News, Va., assignors to Siemens-Bendix Automotive Electronics L.P., Troy, Mich.

Filed Oct. 3, 1989, Ser. No. 416,339

Int. Cl.[5] F01L *9/02, 1/34*

U.S. Cl. 123—90.12 **7 Claims**

1. In an internal combustion engine having multiple combustion chambers and for each combustion chamber a corresponding engine valve for opening and closing the corrresponding combustion chamber during operation of the engine, for each of said valves a corresponding biasing means that biases the valve to close the corresponding combustion chamber, and means for operating each of said valves against the corresponding biasing means to repeatedly intermittently open the corresponding combustion chamber during engine operation, said means for operating each valve including for each valve a corresponding actuator that executes reciprocal motion along a corresponding linear axis, and means for varying the opening and closing phase angles of each valve comprising each of said actuators having means to vary the actuator's effective length by the selective pumping of hydraulic fluid into and out of an expansible and contractible interior hydraulic chamber space of the actuator to respectively expand and contract the volume



of the chamber space, the improvement comprising for each actuator a corresponding solenoid valve that is selectively operable to open and close the communication of the corresponding actuator's interior hydraulic chamber space to a hydraulic gallery that commonly serves all solenoid valves, and means for selectively operating each solenoid valve such that both increases and decreases in the effective length of each actuator are controlled by the corresponding solenoid valve conducting hydraulic fluid supply and spill between the chamber space of the actuator and the hydraulic gallery through the solenoid valve.

4,930,466

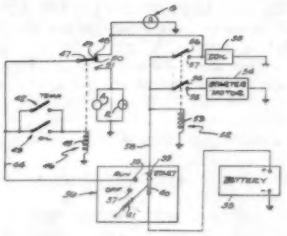
IGNITION SYSTEM FOR INTERNAL COMBUSTION ENGINES

Paul N. Osborne, Jr., 837 Orange, Redlands, Calif. 92373

Filed Jun. 19, 1989, Ser. No. 367,799

Int. Cl.[5] F02P *11/02*

U.S. Cl. 123—179 BG **2 Claims**



1. In an ignition system for an internal combustion engine, said ignition system including a battery , a spark coil and a starter motor, the combination comprising: an ignition switch having an off contact, a run contact and start contact, said ignition switch having a pole for engagement with said off,

start and run contacts in that order, said ignition switch pole being spring biased from said start contact to said run contact, said ignition switch pole being connected from said battery; a starter solenoid having first and second pairs of contacts, said first pair of solenoid contacts being connected from said ignition switch start contact to said starter motor, said second pair of solenoid contacts being connected from said ignition switch start contact to said spark coil; a protective relay having a winding and at least a first pair of contacts, said relay first pair of contacts being normally closed and being connected in series from said run contact to said spark coil; a temperature switch adapted to close on an increase in temperature to a dangerous level; and an oil switch adapted to close when the oil pressure falls to a dangerous level, said temperature and oil switches being connected in parallel with each other, said parallel connection of said temperature and oil switches being connected in series in between said run contact and said relay winding, whereby said second pair of contacts of said starter solenoid maintain a battery voltage across said coil during the starting time required for said oil switch to open.

4,930,467

INTERNAL COMBUSTION ENGINE WITH AUTOMATIC STARTER FOR PORTABLE WORKING MACHINE

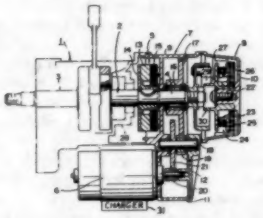
Isao Masuda, Tachikawa, and Gīichi Iida, Tokyo, both of Japan, assignors to Kioritz Corporation, Tokyo, Japan

Filed Nov. 23, 1988, Ser. No. 277,902

Claims priority, application Japan, Nov. 25, 1987, 62-179213[U]

Int. Cl.[5] F02N *17/00*

U.S. Cl. 123—179 P **3 Claims**



1. An internal combustion engine with an automatic starter comprising

the internal combustion engine having a crankshaft;

a generator having

stator windings,

a rotor fixed to said crankshaft,

magnets fixed mounted on said rotor;

a reduction device connecting said automatic starter to said crankshaft;

charger means to operate said automatic starter connected to receive electric power from said stator windings of said generator;

and a recoil-type starter arranged coaxially with and adjacent to said crankshaft for rotation of said rotor through rotation of said crankshaft.

4,930,468

ICE WITH SINGLE INTAKE VALVE AND DUAL INTAKE MANIFOLD RUNNERS

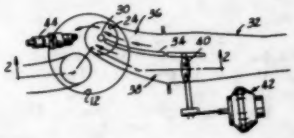
William F. Stockhausen, Northville, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Apr. 6, 1989, Ser. No. 334,254

Int. Cl.[5] F02B *31/00*

U.S. Cl. 123—188 M **11 Claims**

1. An induction system for a multi-cylinder internal combustion engine having at least one intake valve port opening per cylinder, a pair of individual primary and secondary intake manifold runners for each cylinder with each runner connected at one end to an air inlet and both runners connected at their other ends to the same cylinder intake valve port opening, the primary runner being connected to the opening in a manner to effect flow tangentially thereinto to induce a strong swirl motion to the air/fuel mixture inducted into the cylinder, an intake valve mounted for movement into and out of the opening for controlling flow through the same, the latter valve having a stem projecting upwardly therefrom, and deactivation valve means variably moveable in each secondary runner to block or permit air flow therethrough to control the total air flow to its respective intake port opening, each primary runner



having a cross-sectional area that is approximately 40% to 50of the total cross-sectional area of the intake port opening associated therewith to assure a minimum restriction to flow assuring sufficient flow volume of air into the cylinder to define a wide operating range of the engine during flow through only the primary runner while concurrently providing sufficient swirl velocity to the air to stabilize combustion and enhance burn rates of an air/fuel charge inducted into the cylinder through the opening, and wherein the two runners are defined by a common partition wall extending longitudinally towards the stem and laterally, from the floor of the intake air passage, upwardly in the same direction as the stem to provide two side-by-side longitudinally extending runners split by the wall.

4,930,469

OIL PAN FOR AN INTERNAL COMBUSTION ENGINE

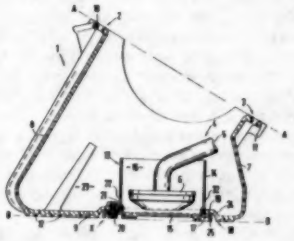
Axel Kamprath, Endingen, and Johannes Weyandt, Illingen, both of Fed. Rep. of Germany, assignors to Dr. Ing. h.c.F. Porsche AG, Fed. Rep. of Germany

Filed Sep. 11, 1989, Ser. No. 405,197

Claims priority, application Fed. Rep. of Germany, Sep. 12, 1988, 3830966

Int. Cl.[5] F01M *1/12*

U.S. Cl. 123—195 C **10 Claims**



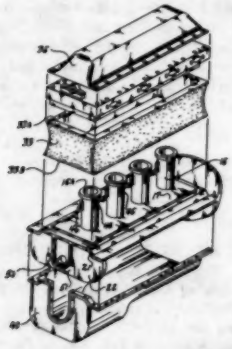
1. An oil pan for an internal combustion engine having walls and a bottom and which is held at a crankcase of an internal combustion engine by screw means, a baffle pot insert being provided adjacent to the bottom, a suction sieve of a device for an oil pump supply of the internal combustion engine resting in the baffle pot insert, wherein the baffle pot insert is a one piece plastic component which is manufactured separately from the oil pan and has a collar extending parallel to the bottom which

rests against an exterior side of the bottom, and wherein the collar is held by baffle pot insert screw means, at a bottom section of the bottom, the bottom section having an opening for receiving the baffle pot.

4,930,470
COMPOSITE ENGINE BLOCK

Daniel M. Kabat, Oxford, and Dominic Fontichiaro, Dearborn Heights, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Jan. 9, 1989, Ser. No. 462,520
Int. Cl.[5] F02F 7/00
U.S. Cl. 123—195 R **11 Claims**



1. A composite engine block for an internal combustion engine having a fluid cooling jacket, comprising:

(a) a bipartite liner structure having metal defining at least the combustion zone walls, said liner structure having one or more open cylinders defining a first part and having a cylinder head, mateable with said first part, defining a second part, said first part having (i) an integral base plate extending transversely outwardly from the cylinders to define a lower imperforate membrane for the bottom of said fluid cooling jacket, and (ii) walls extending dependently from said base plate to support a crankshaft for rotation about an axis transverse to said cylinder, said second part having an integral top plate extending transversely outwardly over the cylinder head to define an upper imperforate membrane for the top portion of the fluid cooling jacket;

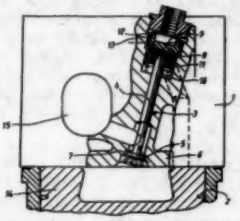
(b) a skin structure comprised of nonmetallic light weight, vibration damping material forming substantially the outer walls of said engine, said skin structure having a first tube-like member sealed between said top and bottom plates to complete said water jacket; and

(c) means for securing and compressing said first member bewteen said plates to seal the ends of the first member against said plates, said first member thereby being secured without need of mechanical fasteners attached thereto.

4,930,471
ENGINE-BRAKING DEVICE FOR INTERNAL-COMBUSTION ENGINE

Wolf-Dietrich Körner, Remseck, and Thomas Harr, Tiefenbronn, both of Fed. Rep. of Germany, assignors to Daimler-Benz AG, Stuttgart, Fed. Rep. of Germany

Filed Oct. 31, 1989, Ser. No. 430,650
Claims priority, application Fed. Rep. of Germany, Nov. 23, 1988, 3839452
Int. Cl.[5] F01M 1/00
U.S. Cl. 123—196 R **4 Claims**



1. Engine-braking device for an internal-combustion engine, comprising:

a throttle valve means, arranged in a cylinder head of the engine;

the throttle valve means controlling a throttle port located between a cylinder and an outlet channel;

a control piston means for actuating the throttle valve;

said control piston being inserted in a control tore in the cylinder head and subjected to compressed air during a braking operation;

said cylinder head being provided with a rocker-arm space means for housing rocker arms of the engine which are provided with bearings lubricated with lubricating oil from a lubricating-oil circuit of the internal-combustion engine;

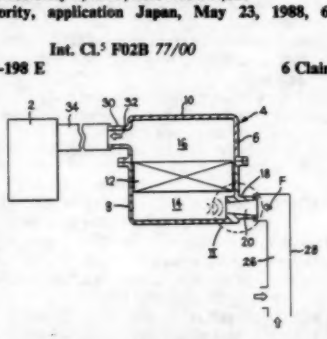
wherein lubricating oil drips out the bearings into the rocker-arm space and is diverted through an oil return bore into the engine crankcase; and

wherein the oil return bore is provided with a connecting orifice to the control bore.

4,930,472
VEHICLE AIR CLEANER

Tadayuki Ozaki, Shizuoka, Japan, assignor to Suzuki Jidosha Kogyo Kabushiki Kaisha, Shizuoka, Japan

Filed May 5, 1989, Ser. No. 348,307
Claims priority, application Japan, May 23, 1988, 63-67906[U]
Int. Cl.[5] F02B 77/00
U.S. Cl. 123—198 E **6 Claims**



1. A vehicle air cleaner installed in an air intake system so that air can be supplied to an internal combustion engine,

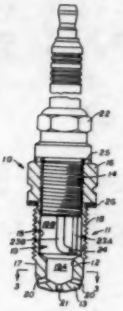
comprising an air cleaner housing having a tubular air inlet port element fixed thereto, said air inlet port element having a suction air passage extending therethrough for communication with an incoming air chamber defined within the housing, said suction air passage having a cross section that gradually decreases along the air flow direction, said suction air passage having a diameter at an inlet end thereof and having an axial length approximately equal to said diameter.

4,930,473

SWIRL CHAMBER AND SPARK PLUG ASSEMBLY

Rainer Dietrich, Celle, Fed. Rep. of Germany, assignor to Texas Ignitors Company, Inc., Houston, Tex.

Filed Dec. 9, 1988, Ser. No. 282,074
Int. Cl.[5] F02B *19/08*
U.S. Cl. 123—266 **16 Claims**



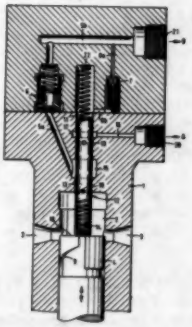
1. A spark plug and swirl chamber assembly comprising;
a spark plug having an extended externally threaded firing end and axially extending elongate electrodes which extend beyond the externally threaded portion and terminate in a spark gap,
a generally cup-shaped spark plug swirl chamber member having internal threads at one end threadedly and releasably engaged on the threaded portion of said spark plug and a central interior bore extending axially therefrom and terminating in a bottom wall vertically spaced from said spark gap,
said swirl chamber member interior bore having a cylindrical portion of a first diameter at the end terminating in a bottom wall and a second cylindrical portion of a second diameter larger than the first extending axially between the first cylindrical portion and the internally threaded portion,
said first cylindrical portion and said second cylindrical portion defining a longitudinally stepped cylindrical swirl chamber having a lower chamber and an upper chamber of larger diameter for swirling gas in relation thereto, and
a plurality of circumferentially spaced small diameter orifices at the bottom of said lower chamber extending angularly inward and upward through the swirl chamber member side wall and open tangentially into said lower chamber and a small diameter central orifice not larger than said sidewall orifices extending axially through said bottom wall for drawing a fuel-air mixture into said stepped swirl chamber and injecting flames from said stepped swirl chamber into the engine combustion chamber,
the outer surface of said swirl chamber member having a radially flanged top portion, a reduced diameter lower portion at the opposite end, and exterior threads extending between the flanged portion and reduced diameter portion for threadedly seating said swirl chamber member in the threaded spark plug receiving hole of an internal combustion engine,
said spark plug elongate electrodes extending longitudinally through said upper chamber and terminating with their gap portion in said upper chamber at the juncture of said upper chamber with said lower chamber, and
said body threadedly received in the spark plug hole of the engine whereby the reduced diameter portion of said body protrudes slightly into the engine combustion chamber and said orifices are exposed for maximum fuel-air mixture and flame communication with the engine combustion chamber.

4,930,474

DISTRIBUTION AND CONTROL VALVE FOR A FUEL INJECTION PUMP

Gösta Liljenfeldt, Solf, Finland, assignor to Oy Wärtsilä AB, Helsinki, Finland

Filed May 4, 1989, Ser. No. 348,601
Claims priority, application Finland, May 16, 1988, 882275
Int. Cl.[5] F02M *39/00*
U.S. Cl. 123—300 **9 Claims**



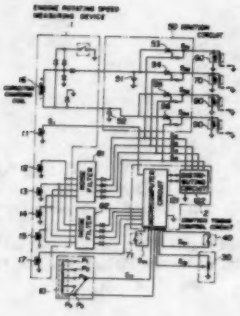
1. A distribution and control valve in a fuel injection engine pump especially for a large multi-cylinder diesel engine, in which the fuel is injected into the cylinder by means of two or more injection valves (A;B), which pump includes a pump cylinder (1) and, inside thereof in a pump chamber (2), a reciprocatingly movable piston member (4) arranged through its movement to feed fuel via distribution ducts to the injection valves of the cylinder in question, the pump cylinder (1) being provided with an extra chamber (11) connected to the pump chamber (2), said extra chamber (11) enclosing a long-shaped valve member (12) tightly adapted therein and arranged to follow the movements of said piston member (4) in the axial direction thereof, and located inside said valve member (12) a fuel distribution duct (13) connected to said pump chamber (2), the feed ducts (16;5*a*,5*b*) of the separate valves being connected to said extra chamber (11) in the axial direction of the valve member (12) to different positions at a distance from each other, said valve member (12) being provided with control and feeding means for directing fuel from the pump chamber (2) to the feed ducts (16;5*a*,5*b*) of each injection valve. (A;B), said control and feeding means together with said feed ducts (16;5*a*,5*b*) being arranged to be positioned relative to each other so as to feed fuel to separate injection valves (A;B) at least partly at different times.

4,930,475

IDLING ROTATING SPEED CONTROL SYSTEM OF OUTBOARD ENGINE

Keisuke Daikoku, and Kazuhiro Umehara, both of Shizuoka, Japan, assignors to Suzuki Jidosha Kogyo Kabushiki Kaisha, Shizuoka, Japan

Filed May 25, 1989, Ser. No. 357,423
Claims priority, application Japan, Aug. 31, 1988, 63-217959
Int. Cl.[5] F02M 51/00; F02D 41/16, 9/02
U.S. Cl. 123—339 6 Claims



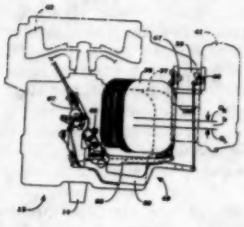
1. In an idling rotating speed control system for an outboard engine, including a throttle sensor to detect a throttle opening degree, a neutral switch having a mechanism which can be started only if a clutch is set to a neutral mode, a remote control box to execute opening and closing operations of the clutch and throttle, a manual change-over switch to select an ignition timing for a trolling mode, and an ignition circuit to send an ignition signal to an ignition coil, the improvement comprising rotating speed measuring means for measuring rotating speed of the engine, and an ignition timing control circuit to output an ignition timing control signal to the ignition circuit on the basis of the throttle opening degree, the engine rotating speed, and a gear position.

4,930,476

GOVERNOR FOR VERTICAL V-TYPE ENGINE

Kiyohiko Oguri, and Tsuyoshi Ohkawa, both of Iwata, Japan, assignors to Yamaha Hatsudoki Kabushiki, Iwata, Japan

Filed Jul. 19, 1989, Ser. No. 382,091
Int. Cl.[5] F02D 31/00
U.S. Cl. 123—376 4 Claims



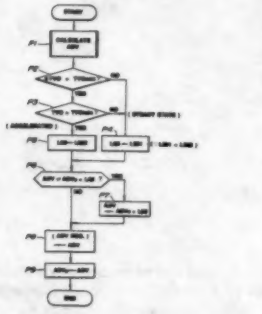
1. A governor mechanism for an internal combustion engine having a pair of cylinder banks disposed at an angle relative to each other, said cylinder banks being staggered along the length of the output shaft of the engine, a speed responsive element driven by said output shaft contiguous to the adjacent end of said cylinder banks, a throttle valve positioned adjacent the other ends of said cylinder banks for controlling the speed of said engine, and linkage means interconnecting said speed responsive means to said throttle valve for maintaining a desired engine speed, said linkage means including at least one member extending along one side of the cylinder which side is positioned further from a plane defined by the corresponding side of the other cylinder bank so that the member is disposed within the stagger area of the cylinder banks.

4,930,477

SYSTEM AND METHOD FOR CONTROLLING IGNITION TIMING FOR INTERNAL COMBUSTION ENGINE

Yasutoshi Nanyoshi, Hyogo; Toshio Matsumura, Kanagawa; Tatsuo Morita, Kanagawa, and Hidetoshi Shigyo, Kanagawa, all of Japan, assignors to Nissan Motor Company, Limited, Japan

Filed Oct. 17, 1988, Ser. No. 258,685
Claims priority, application Japan, Oct. 15, 1987, 62-260990
Int. Cl.[5] F02P 5/04
U.S. Cl. 123—422 13 Claims



1. A system for controlling an ignition timing for an internal combustion engine, comprising:

(a) first means for detecting an engine operating condition;

(b) second means for detecting whether an engine acceleration exceeding a predetermined value occurs;

(c) third means for setting an ignition timing value according to the detected engine operating condition;

(d) fourth means for setting a limit value to limit a difference between a current ignition timing value and a previous ignition timing value according to a result of detection by means of the second means;

(e) fifth means for providing a limit for the current ignition timing value so that the difference is within the limit value and setting the current ignition timing value;

(f) sixth means for storing the current ignition timing value set by the fifth means therein as the previous ignition timing value; and

(g) seventh means for igniting air-fuel mixture supplied to each engine cylinder at a timing whose value is determined by the fifth means.

4,930,478

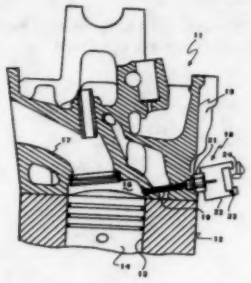
METHOD OF OPERATING AN ENGINE

Steven L. Plee; Peter Hartman, both of Northborough, Mass.; Jay K. Martin, Madison, Wis.; J. Paul Nolan; Donald J. Remboski, Jr., both of Northborough, Mass., and Richard R. Ross, Shrewsbury, Mass., assignors to Barrack Technology Limited, Marlborough, Mass.

Filed May 13, 1988, Ser. No. 193,918
Int. Cl.[5] F02P 5/14; G01L 23/22
U.S. Cl. 123—425 11 Claims

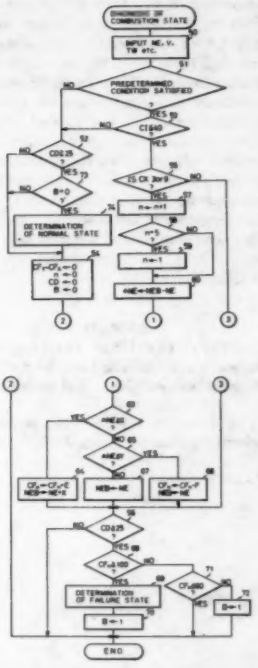
1. The method of operating an internal combustion chamber, means for forming a combustible fuel/air mixture within the

combustion chamber and means for detecting the luminosity within the combustion chamber during each cycle of operation



of the engine from prior to initiation of combustion until after the completion of combustion process, and adjusting the fuel /air ratio to maintain the desired luminosity characteristics.

the engine speed detected by said variation detecting means is larger than a predetermined second variation in



the engine speed which is smaller than said predetermined first variation in the engine speed.

4,930,479

IRREGULAR COMBUSTION DETERMINING DEVICE FOR AN INTERNAL COMBUSTION ENGINE

Kouichi Osawa, Susono; Norio Shibata, Toyota, and Shinichi Abe, Aichi, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Filed May 22, 1989, Ser. No. 355,173

Claims priority, application Japan, May 24, 1988, 63-126757; Jul. 22, 1988, 63-183859; Apr. 28, 1989, 1-107801

Int. Cl.[5] F02D *41/14*

U.S. Cl. 123—436 **19 Claims**

1. An irregular combustion determining device for an internal combustion engine, comprising:

an engine speed detecting means for detecting an engine speed at a predetermined crank angle;

a variation detecting means for sequentially detecting a variation in an engine speed on the basis of two successive engine speeds detected by said engine speed detecting means;

first determining means for determining that an irregular combustion has occurred when the variation in the engine speed detected by said variation detecting means is larger than a predetermined first variation in the engine speed; and

second determining means for determining that, when said first determining means determined that an irregular combustion has occurred, at a next detection of the variation of the engine speed by said variation detecting means, an irregular combustion has occurred when the variation in

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4,930,480

AIR-FUEL RATIO CONTROL SYSTEM

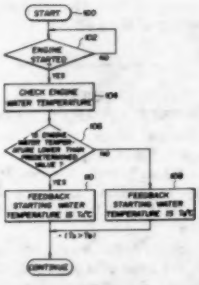
Takahiro Noyori, Hamamatsu, Japan, assignor to Suzuki Jidosha Kogyo Kabushiki Kaisha, Shizuoka, Japan

Filed Apr. 21, 1989, Ser. No. 341,790

Claims priority, application Japan, Apr. 30, 1988, 63-108664

Int. Cl.[5] F02D *41/14*

U.S. Cl. 123—440 **2 Claims**



1. An air-fuel ratio control system for an engine having

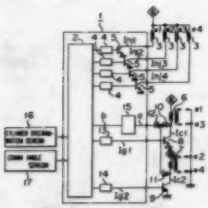
intake and exhaust pipes, comprising: temperature sensor means for sensing a temperature in the engine; exhaust gas sensor means for sensing the concentration of an exhaust gas in the exhaust pipe; fuel supply means for supplying an air-fuel mixture to the intake pipe; and control means for determining a change temperature in dependence on an engine start temperature detected by said temperature sensor means when the engine is started, for thereafter controlling said air-fuel mixture produced by said fuel supply means independently of said exhaust gas sensor means until the engine temperature detected by said temperature sensor means reaches said change value, and for thereafter controlling said air-fuel ratio produced by said fuel supply means as a function of an output of said exhaust gas sensor means; wherein when said detected start temperature is respectively below and above a predetermined temperature said change temperature is determined to be a respective one of a first temperature and a second temperature greater than said first temperature; and wherein said predetermined temperature is −20° C., said first temperature is 20° C., and said second temperature is 40° C.

4,930,481

ENGINE CONTROL APPARATUS

Takanori Fujimoto, and Toshirou Hara, both of Himeji, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 14, 1989, Ser. No. 366,086
Claims priority, application Japan, Jul. 27, 1988, 63-188828
Int. Cl.[5] F02D 41/22, 17/02
U.S. Cl. 123—481 **4 Claims**



1. An engine control apparatus which comprises a cylinder discrimination sensor for generating cylinder discrimination signal; a crank angle sensor for generating crank angle signal, a fuel injection valve provided in each cylinder of the engine; an ignition coil provided in correspondence to each and every cylinder; a misfire detection means for detecting a state of misfire in each cylinder on the basis of a state of signal of said ignition coil; and a misfiring cylinder detection means for receiving the cylinder discrimination signal, the crank angle signal and the output signal of said misfire detection means to detect that the state of misfiring has occurred continuously at the same cylinder, and means for closing the fuel injection valve corresponding to the cylinder where the misfiring has occurred.

4,930,482

FUEL CONTROL APPARATUS FOR ENGINES

Hajime Kako, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

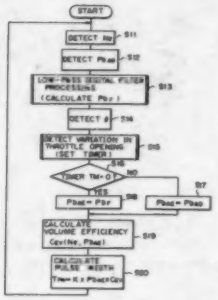
Filed Jun. 5, 1989, Ser. No. 361,086
Claims priority, application Japan, Jun. 15, 1988, 63-147277
Int. Cl.[5] F02D 41/10, 41/30
U.S. Cl. 123—488 **10 Claims**

1. An engine control apparatus for controlling fuel injection of an engine on the basis of a pressure value relating to the pressure in an intake pipe of the engine, comprising:

a filter means supplied with said pressure value and performing low-pass filter processing of said pressure value to output a filter-processed pressure value;

a load variation detecting means for monitoring load variations of said engine to output a detection signal when any load variation is equal to or larger than a predetermined value;

a timer means operable for a predetermined period of time in response to said detection signal; and



a selector means controlled by said timer means and operable to select said pressure value during the period of time when said timer means is operative and said filter-processed pressure value during the period of time when said timer means is inoperative;

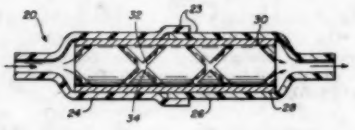
whereby fuel injection of said engine is controlled on the basis of either the pressure value or the filter-processed pressure value selected by said selector means.

4,930,483

FUEL TREATMENT DEVICE

Wallace R. Jones, 5702 Trails Edge Ct., Arlington, Tex. 76017

Filed Aug. 11, 1989, Ser. No. 392,484
Int. Cl.[5] F02M 33/00
U.S. Cl. 123—538 **7 Claims**



1. A fuel treatment device for internal combustion engines comprising

a housing having an inlet and an exit,

a metallic element in said housing,

a metallic core in said housing and adapted to form a non-linear flow path in cooperation with said metallic element,

wherein said metallic element comprises aluminum, and

wherein said metallic core comprises an alloy of aluminum, copper, tin, zinc, iron, nickel, lead, sulfur and phosphorus.

4,930,484

FUEL AND AIR MIXTURE EXPANDING AND PREHEATING SYSTEM

Steven M. Binkley, 424 Stadium Dr., Apt. O-3, and Clinton D. McCarty, 424 Stadium Dr., Apt. L-2, both of Ada, Okla. 74820

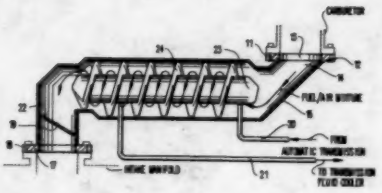
Filed Oct. 26, 1989, Ser. No. 426,665
Int. Cl.[5] F02M 31/00
U.S. Cl. 123—546 **14 Claims**

1. A fuel and air mixture expanding and preheating system, comprising:

a heat exchanger body;

a first mounting plate at one end of said body dimensioned for mounting a carburetor of an internal combustion engine;

a second mounting plate at an opposite end of said body dimensioned for attachment to an intake manifold of an internal combustion engine;



a heating fluid inlet of said heat exchanger adapted for connection to an automatic transmission fluid line of a vehicle transmission;

and

a heating fluid outlet of said heat exchanger adapted for connection to an inlet of a transmission fluid cooler of a vehicle, whereby a fuel and air mixture from a vehicle carburetor is heated and expanded in said heat exchanger body prior to induction into an intake manifold.

4,930,485

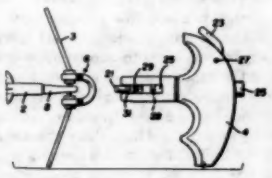
ARCHERY BOW SYSTEM HAVING A CENTER NOCK AND STRING DRAWING APPARATUS

Hermann Kopper, Miami, Fla., assignor to Kopher Precision Instruments, Inc., Miami, Fla.

Filed Sep. 11, 1989, Ser. No. 405,234

Int. Cl.[5] F41B *5/00*

U.S. Cl. 124—91 **7 Claims**



1. An archery bow system comprising a bow, a bow string attached to the bow; a center nock attached to the bow string, the center nock forming a half loop having two ends, each end attached to the bow string; and a handheld bowstring drawing device including a releasable draw pin for engagement with said half loop, and a trigger in engagement with said draw pin for releasing the draw pin, said ends of said half loop each forming an eyelet for receiving said bow string, said eyelet including a split for opening said eyelet, and closing means for snugly closing said split.

4,930,486

BLADE CUTTING METHOD FOR HARD BRITTLE MATERIAL

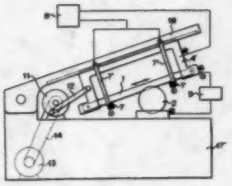
Akio Kuromatsu, Yokohama, Japan, assignor to Applied Magnetic Lab Co., Ltd., Kanagawa, Japan

Division of Ser. No. 139,752, Dec. 30, 1987. This application Nov. 3, 1988, Ser. No. 266,703

Claims priority, application Japan, Mar. 3, 1987, 62-48354; Mar. 3, 1987, 62-31009; Oct. 2, 1987, 62-249210

Int. Cl.[5] B24B *53/007, 1/04*

U.S. Cl. 125—11.01 **9 Claims**



1. A method for cutting a hard workpiece with an elongate metal band blade maintained under tension and reciprocated with a longitudinal cutting edge pressed against the workpiece, comprising the steps of:

providing an abrasive electrically conductive layer attached to the blade at said longitudinal cutting edge;

connecting a first power source to the blade and to an electrode held stationary and close to the conductive abrasive layer, for thereby slectively applying a continuous or intermittent voltage difference between the blade and the electrode so as to provide a positive pole to the blade;

supplying an electrically conductive processing fluid to at least a processing portion between said blade and said workpiece and between said blade and said electrode; and

connecting a second power source to the blade and to the workpiece, for thereby selectively applying a continuous or intermittent voltage difference between the blade and the workpiece such that said workpiece thereby is a positive pole with respect to said blade.

4,930,487

CEMENT CUTTING BLADE

Rick Younger, 1730 Primrose Path, Las Vegas, Nev. 89108

Filed Oct. 4, 1989, Ser. No. 416,858

Int. Cl.[5] B28D *1/04;* E01C *23/09*

U.S. Cl. 125—15 **20 Claims**

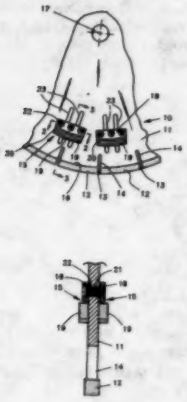
1. A circular saw blade assembly for cutting in a single pass a two tier groove in a paved areaway, the saw blade assembly including a single circular blade body of substantially uniform thickness having a plurality of cutting elements in the form of metallic matrices containing fragmented diamond particles secured to the periphery of the blade body, wherein the improvement comprises:

(a) a plurality of cutting blocks also in the form of metallic matrices containing fragmented diamond particles providing cutting faces,

(b) the circular blade body intermediate its periphery and its center and at a location remote of the cutting elements having a plurality of discrete spaced cutting block positioning means arranged in a circular configuration concentrically of the blade periphery, and

(c) retention means securing the cutting blocks to the blade

body at the positioning means with cutting faces on opposite sides of the blade body,



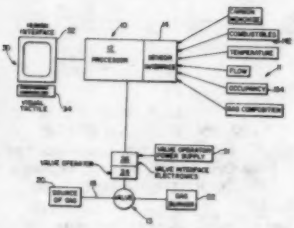
whereby the cutting faces coact to cut a groove in the concrete above and wider than the groove cut by the cutting elements on the blade body periphery.

4,930,488

PROCESSOR-CONTROLLED GAS APPLIANCES AND MICROPROCESSOR-ACTUATED VALVES FOR USE THEREIN

A. Noel J. Pearman, St. Paul; Gerald D. Hunter, Lino Lakes, and Michael A. Woessner, Golden Valley, all of Minn., assignors to Gas Research Institute, Chicago, Ill.

Filed Aug. 18, 1988, Ser. No. 233,523
Int. Cl.[5] F24C *3/00*; F17D *3/00*
U.S. Cl. 126—39 E **14 Claims**



1. A gas appliance comprising:

a gas burner for burning gas and producing a flame;

valve means having an input port adapted to be connected to a source of combustible gas, and an output port, said valve means including a control means for controlling flow of said gas from the input port to the output port of said valve means;

means for conveying gas from said output port to said gas burner;

sensor means in close proximity to said gas burner for sensing a controllable characteristic of said flame; and

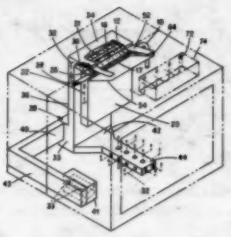
computer control means responsive to said sensed controllable characteristic for providing a control signal, said control means responding to said control signal by changing the flow of gas through said valve means.

4,930,489

GAS OVEN HAVING FLAME SWITCHING

David H. McFadden, Lexington, Mass., assignor to Gas Research Institute, Chicago, Ill.

Continuation-in-part of Ser. No. 135,932, Dec. 21, 1987, Pat. No. 4,802,459. This application Feb. 6, 1989, Ser. No. 306,834
Int. Cl.[5] A47J *37/00*
U.S. Cl. 126—41 R **37 Claims**



1. A flame switchable gas burning device for use as a radiant and a convection heat source in a gas stove having an oven cavity therein said device comprising:

a burner tube having a plurality of front-facing flame ports thereon;

means for substantially directing fresh air through an upper and a lower gap proximate to said burner tube over substantially the length of said burner tube;

means for creating a low pressure zone over the length of said burner tube above and rearward of said burner tube, said low pressure zone adequate in size to allow the passage therethrough of a flame which will emanate from said flame ports when said burner tube is appropriately connected to a source of gas and is appropriately ignited and said means for creating a low pressure zone also causing recirculation air to flow from said low pressure zone into said oven cavity;

means for activating and deactivating said means for creating a low pressure zone thereby causing said flame to switch from bake to broil when said means for creating a low pressure zone is deactivated;

a broil flame channel within which a broil flame from said flame ports is contained when said means for creating a low pressure zone is deactivated, comprising a spreader plate having a width substantially equal to the length of said burner tube and appropriately positioned above said burner tube and associated with said low pressure zone so as to permit a flame from said flame ports to enter said low pressure zone, when said low pressure zone is present, without substantially impinging onto said spreader, and a shield plate having a width substantially equal to the width of said spreader plate, one end positioned appropriately below said burner tube and in association with said lower gap and sloping upwardly and toward said spreader plate thereby creating said broil flame channel and having a front-facing broil flame channel opening with a height dimension less than the rearward spacing between said spreader and said shield, said broil flame distributed over and attached to said shield plate;

means for diverting a controllable portion of said recirculation air creating shunt air and an appropriate volume of flame switching air said flame switching air directed toward said burner tube and into said low pressure zone and said shunt air combines with said switching air and recirculated as said recirculation air by said means for creating a low pressure zone; and

means for attaching said gas burning device to the roof surface of said oven cavity.

4,930,490

GAS LOG APPARATUS

Alexander Allan, Scarborough, Canada, assignor to Gas Application Products (GAP) Inc., Downsview, Canada

Filed May 30, 1989, Ser. No. 357,775
Int. Cl.[5] F24C 3/04; F23Q 2/32
U.S. Cl. 126—92 R 6 Claims

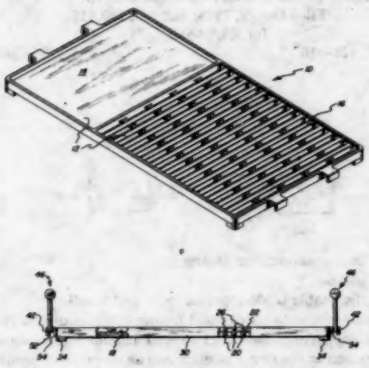
1. An apparatus simulating natural log fire, comprising a grate, at least two artificial logs supported in the grate so as to extend laterally thereof with a laterally extending vertical opening between them, and a burner assembly supported by the grate, the burner assembly including a gas nozzle, air induction means associated with the nozzle to produce a fuel/air mixture, and a plenum chamber receiving the mixture and defining a laterally extending row of polygonal burner ports directed upwardly beneath said vertical opening, the ports being formed at the apex of an inverted V-shaped ridge in an upper wall of the plenum chamber, by openings extending vertically through said upper wall, the ports being of varying lateral extent and spacing, and having sharply angled vertices.

4,930,491

PORTABLE COMBINATION COOKING GRILL

Alfred C. Purello, 114 Greenleaf Dr., Newtonville, N.Y. 12128

Filed Feb. 21, 1989, Ser. No. 312,473
Int. Cl.[5] F24C 15/16
U.S. Cl. 126—332 13 Claims



1. An improved portable combination cooking grill and server designed to removably rest upon a conventional outdoor barbecue when used as a grill, said combination grill and server comprising:

a portable unitary cooking surface sized to removably rest upon the conventional barbecue, said portable surface [illegible] section and a charbroil section;

having a [illegible] horizontally-extending

said griddle section comprising a [illegible] solid surface for frying food;

said charbroil section including a plurality of ribs spaced substantially parallel to each other and a plurality of struts interconnecting said ribs, said plurality of spaced ribs and said plurality of interconnecting struts defining areas of perforation that allow the passage of smoke and flames but are sized sufficiently small to inhibit the passage of food therethrough, each of said ribs having a substantially flat top surface, said rib top surfaces defining a horizontally-extending surface for charbroiling food, whereby said portable cooking grill may be utilized to simultaneously and efficiently fry and charbroil food over a conventional barbecue; and

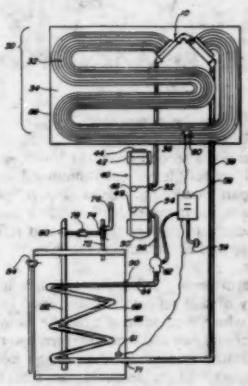
detachable handle means capable of engaging said cooking surface for removing said surface from the conventional outdoor barbecue and for moving the combination grill and server to a location remote from the barbecue.

4,930,492

SOLAR WATER HEATING SYSTEM

Albert C. Rich, 12811 Bexhill Ct., Herndon, Va. 22071

Filed Jun. 16, 1989, Ser. No. 367,017
Int. Cl.[5] F24J 2/40
U.S. Cl. 126—420 15 Claims



1. A solar water heating system comprising:

a solar energy collector comprising solar energy absorbing means communicating with a fluid distribution manifold;

a fluid pump operatively associated with a differential controller having temperature sensing means for measuring the temperature of said solar energy absorbing means and a water storage tank;

a fluid drainback tank communicating with said fluid distribution manifold for collecting drainage fluid from said fluid distribution manifold and communicating with said fluid pump; and

a heat exchanger operatively associated with said water storage tank, said heat exchanger communicating with said pump;

wherein said fluid distribution manifold is positioned at an angle relative to a horizontal plane to allow for self-drainage when the pump is inactivated and comprises:

a fluid conduit means;

valve means disposed in said fluid conduit means;

said valve means separating a heat extracted fluid conduit portion and a heated fluid conduit portion in said fluid conduit means;

said heat extracted fluid conduit portion having a heat extracted fluid inlet means communicating with said heat exchanger and a heat extracted [illegible] fluid outlet means communicating with said solar energy collector;

said heated fluid conduit [illegible] portion having a heated fluid inlet means communicating with said solar energy [illegible] collector and a heated fluid outlet means communicating with said fluid drainback tank; and

said valve means sealing said heat extracted fluid conduit

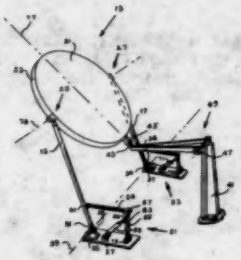
portion from said heated fluid conduit portion during operation of said pump.

4,930,493

MULTI-LEVER RIM-DRIVE HELIOSTAT

Daniel V. Sallis, 5720 Blue Sage Dr., Littleton, Colo. 80123

Filed May 9, 1988, Ser. No. 192,691
Int. Cl.[5] F24J 2/10; G03B 31/00
U.S. Cl. 126—438 13 Claims



1. Heliostat assembly, comprising:

a. solar reflector;

b. first lever and a second lever, the lower ends of said first and said second lever each mounted at horizontally spaced apart locations to a fixed support base by universal joint means, the upper ends of said first and second lever each mounted to the periphery of said reflector at horizontally spaced apart locations thereon by universal joint means;

c. central arm having a first end which is mounted to the periphery of said reflector by universal joint means at a location which is equidistant from the mounting locations thereon of said first and second levers, and the second end of said central arm mounted by hinge joint means to a fixed support at a location equidistant from the lower ends of said first and second levers, said hinge joint means providing for rotation about a horizontal axis only; and

d. drive means for pivoting said first and said second levers relatively in opposite directions by preselected amounts to provide azimuthal steering of said reflector, and for pivoting said levers relatively in the same direction to provide elevational steering of said reflector.

4,930,494

APPARATUS FOR BENDING AN INSERTION SECTION OF AN ENDOSCOPE USING A SHAPE MEMORY ALLOY

Sakae Takehana, Hachioji; Yasuhiro Ueda, Kokubunji; Masakazu Gotanda, Tsukui; Tomohisa Sakurai, and Hideyuki Adachi, both of Hachioji, all of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Dec. 28, 1988, Ser. No. 291,242
Claims priority, application Japan, Mar. 9, 1988, 63-53759; Mar. 28, 1988, 63-73827[U]; Apr. 13, 1988, 63-91093[U]; Apr. 13, 1988, 63-91094[U]; Apr. 21, 1988, 63-99040[U]; May 19, 1988, 63-65140[U]; Jun. 2, 1988, 63-136441[U]; Nov. 17, 1988, 63-150069; Nov. 24, 1988, 63-296803[U]
Int. Cl.[5] A61B 1/00
U.S. Cl. 128—4 37 Claims

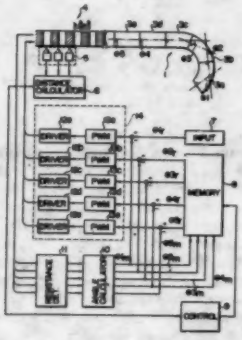
1. A shape memory apparatus comprising:

a probe composed of a plurality of segments coupled to one another and adapted to be moved inside a tubular member, each said segment including a shape memory element so that the probe bends as the shape memory element changes its shape;

means for inputting a target value of the bend angle for a specific segment;

means for detecting the bend angle of each said segment each time the probe is moved for a predetermined distance; and

temperature adjusting means connected to said probe, said input means, and said detecting means, said adjusting means serving to control the temperature of the shape memory element so that the detected bend angle of the



shape memory element agrees with such a target angle that said inputted angle being set as the target angle for the specific segment, and said detected bend angle of each segment being set as the target angle for segment following the specific segment with respect to the moving direction.

4,930,495

LARYNGOSCOPE INCLUDING A DISPOSABLE BLADE AND ITS METHOD OF USE

Michael S. Upsher, San Mateo, Calif., assignor to The Upsher Laryngoscope Corporation, Burlingame, Calif.

Filed Dec. 9, 1988, Ser. No. 282,115
Int. Cl.[5] A61B 1/26
U.S. Cl. 128—10 6 Claims

1. A laryngoscope, comprising:

(a) a handle;

(b) a disposable blade separate from said handle;

(c) means forming part of said handle and part of said blade for supporting the blade to said handle for movement between an operative position and an inoperative position, said supporting means including a blade attaching head portion of said handle and a handle connecting segment of said blade; and

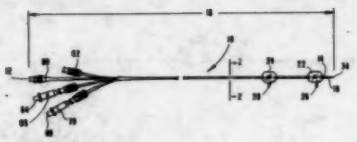
(d) means for retaining said blade in its operative position after the blade has been placed in that position for the first use, said retaining means including at least one component thereof which is adapted to be damaged as a result of said first use to a degree sufficient to prevent said retaining means from reliably retaining said blade in its operative position a second time, said retaining means including at least one recess in said blade attaching head portion and a frangible projection in said handle connecting end segment of said blade, said frangible projection serving as said one component of said retaining means.

4,930,496

METHOD AND DEVICE FOR REMOVING A STONE FROM A URETER USING EXTRACORPOREAL SHOCK WAVE LITHOTRIPSY

Rodney W. Bosley, Jr., Bloomington, Ind., assignor to Vance Products, Inc., Spencer, Ind.

Filed Jul. 22, 1988, Ser. No. 223,002
Int. Cl.[5] A61H *1/00*
U.S. Cl. 128—24 A 7 Claims



1. A method for removing a stone from a ureter comprising the steps of;

inserting a catheter having a distal balloon, a proximate balloon and a side opening lumen with the lumen's opening positioned between the balloons into a ureter containing a stone;

positioning the catheter so that the balloons are on opposite sides of the stone;

inflating both balloons to form a stone containing cavity defined by the walls of the balloons and the walls of the ureter;

injecting liquid through the side opening lumen into the cavity;

subjecting the stone to extracorporeal shock waves to at least partially disintegrate the stone;

deflating the proximate balloon; and,

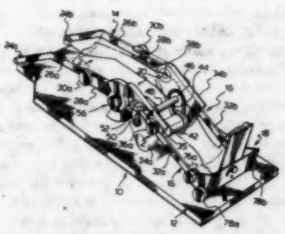
flushing portions of the stone from the cavity by injecting liquid through the side opening lumen.

4,930,497

APPARATUS FOR IMPARTING CONTINUOUS PASSIVE MOTION TO A LOWER LIMB

John H. Saringer, Markham, Canada, assignor to Toronto Medical Corp., Scarborough, Canada

Filed Jan. 23, 1989, Ser. No. 300,040
Int. Cl.[5] A61H *1/02*
U.S. Cl. 128—25 R 8 Claims



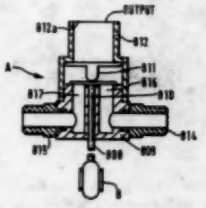
1. An apparatus for imparting passive motion for mobilizing a knee joint of a patient, the apparatus including a base, a thigh support member, including a pair of elongated parallel spaced-apart brace members pivoted at their respective first ends to the base, the other ends of the thigh support brace members terminating at a mechanical hinge, a calf support including a pair of parallel spaced-part brace members extending from the mechanical hinge, the base being provided with means for supporting the other ends of the brace members of the calf support while allowing for extension and retraction thereof; the mechanical hinge including a respective shaft fixed to one of the thigh support or calf support between the respective pairs of brace members with the brace members of the other of the thigh support or calf support journaled to the shafts; motor means mounted to the other of the thigh support or calf support to drive the shafts such that the angular movement is provided between the thigh support and the lower leg support, whereby the angular speed is maintained constant.

4,930,498

VENTILATOR APPARATUS AND FLUID CONTROL VALVE

Zamir Hayek, Herzlia, Israel, assignor to Dranez Anstalt, Vaduz, United Kingdom

Filed Dec. 21, 1988, Ser. No. 287,144
Claims priority, application United Kingdom, Feb. 4, 1986, 8602646; Jul. 26, 1986, 8618254
Int. Cl.[5] A61H *31/02*
U.S. Cl. 128—30.2 9 Claims



1. Ventilator apparatus for use in ventilation of the lungs of a patient, comprising a ventilator enclosure for receiving at least the chest region of the patient's body, and means for varying the pressure in the enclosure to produce ventilation, said pressure varying means comprising a source of positive gas pressure, a source of negative gas pressure, and valve means connected between said sources and said housing, said valve means comprising a valve body, a main chamber and at least two subsidiary chambers in said valve body, a main port connected for gas flow to said housing and communicating with the main chamber in said valve body, at least two subsidiary ports, one subsidiary port being connected for gas flow to said source of positive pressure and the other said port being connected for gas flow to said source of negative pressure and each said port communicating with a respective said subsidiary chamber in said valve body, a valve seat in said valve body, said subsidiary chambers being mutually isolated and opening into the main chamber at respective openings in said valve seat, a rotary shutter member having a sealing face overlying said valve seat openings which controls fluid flow between said main and subsidiary chambers, and an electronic stepper motor connected to said shutter member for selectively rotating the shutter member, the shutter member having an opening so disposed in relation to the said chambers that the shutter member is rotatable between a range of positions for each subsidiary chamber at which fluid flow is permitted through the shutter opening only between that subsidiary chamber and the main chamber, and through a range of positions in which the subsidiary chambers and main chamber are all mutually isolated.

4,930,499

SACRAL BRACE

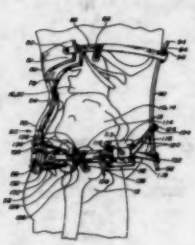
Daniel G. Rowe, 2156 RObIyn, St. Paul, Minn. 55104

Filed Feb. 16, 1989, Ser. No. 311,338
Int. Cl.[5] A61F *5/04*
U.S. Cl. 128—78 10 Claims

1. An improved extended wear sacral brace for supporting and binding the sacro-iliac and lumbo-sacral joints which has a leverage mechanism and which spreads its exerted forces over the sacral regions, massages the lumbo-sacral and sacro-iliac regions, absorbs shear forces between the brace and pelvis,

provides relief for boney spinous processes and permits air circulation about the lumbo-sacral and pelvic regions of the body, comprising

(a) a rigid posterior sacral pad with upper and lower lateral projecting portions with open regions therebetween for air circulation, a vertical central channel for spinous processes relief and air circulation and left and right padding on the pad adjacent the central channel which makes the brace wearable, for extended wear, spreads the pad's exerted forces over the sacral regions, absorbs shear forces between the brace and pelvis and together with the pad massages the lumbo-sacral and sacro-iliac regions;



(b) an abdominal leverage plate for anchoring the sacral pad with upper and lower portions each curving outwardly from the wearer's abdomen to permit extended wear of the brace as the wearer walks, stands and sits;

(c) left and right sacral pad and abdominal plate tying straps for connecting either of the two corresponding upper or lower portions of the sacral pad and abdominal plate, and

(d) left and right leverage mechanisms for connecting the other of the two corresponding upper or lower portions of the sacral pad and abdominal plate and for permitting the sacral pad to exert its forces and massage the lumbo-sacral and sacral-iliac regions.

4,930,500

SELF-ADHESIVE BANDAGE

Burton D. Morgan, 1790 Stoney Hill Dr., Hudson, Ohio 44236

Filed Jul. 11, 1988, Ser. No. 217,422

Int. Cl.[5] H61L *15/00*

U.S. Cl. 128—156 **6 Claims**

1. A self-adhesive bandage comprising in combination:

a carrier strip;

an air-permeable, hydrophilic gel material further comprising the reaction product of an acrylamide compound, and a bis-functional cross-linking agent, mixed with water and a hydrophilic polyol; and

a removeable release paper, wherein said carrier strip is formed from a fabric, and wherein the surface of said carrier strip that is intended for placement against a wearer's skin includes a first portion thereof coated with a pressure sensitive adhesive, and a second portion thereof coated with said gel material, and

wherein further, said release paper is held over said surface by said pressure sensitive adhesive.

4,930,501

VENTILATOR

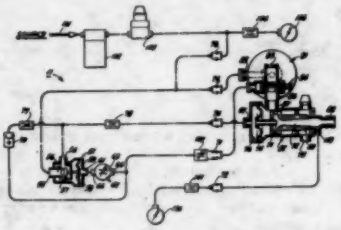
Forrest M. Bird, P.O. Box 817, Sandpoint, Id. 93964

Division of Ser. No. 111,139, Oct. 19, 1987, Pat. No. 4,838,260, which is a continuation of Ser. No. 866,790, May 23, 1986, abandoned. This application Aug. 29, 1988, Ser. No. 237,965

The portion of the term of this patent subsequent to Jun. 13, 2006, has been disclaimed.

Int. Cl.[5] A61M *16/00*

U.S. Cl. 128—204.25 **4 Claims**



1. In small compact light weight ventilator adapted to be connected to a source of gas and adapted to be carried on the person of a patient so that gas can be supplied to the airway of the patient, a case having a cylindrical configuration, an inlet mounted on the case adapted to be connected to the source of gas, an oscillator cartridge mounted in the case and having a body, the body having an inlet and an outlet and a flow passage interconnecting the inlet and the outlet, diaphragm means mounted within the body, a valve member disposed on one side of the diaphragm means and connected to the diaphragm means and being movable between open and closed positions with respect to the outlet, a servo port on the other side of the diaphragm means for supplying gas to the other side of the diaphragm to cause movement of the diaphragm means to thereby move the valve member between open and closed positions to interrupt the flow of gas from the inlet to the outlet, means connecting the inlet of the oscillator cartridge to the inlet mounted on the case, an adjustable impact metering valve having an inlet and an outlet, a patient adapter adapted to be coupled to the airway of the patient, pneumatic clutching means having an output coupled to the patient adapter, one-way check valve means coupling the inlet of the adjustable impact metering valve to the outlet of the oscillator cartridge, means coupling the outlet of the impact metering valve to the servo port, range calibration means connected to the inlet of the impact metering valve and, via said one-way check valve means, to the outlet of the oscillator cartridge and manually operated valve means connecting the range calibration means to the pneumatic clutching means, said adjustable impact metering valve providing a single control for the ventilator and in combination with said one-way check valve means and said range calibration means making it possible to stack successive volumes of gas on the airway of the patient, said manually operated valve being movable between open and closed positions and in an open position coupling the servo port to the pneumatic clutching means to interrupt the stacking of the successive volumes of gas.

4,930,502

ANASTOMOSIS DEVICE

Fusen H. Chen, 240 Thompson Rd., Webster, Mass. 01570

Filed Jan. 26, 1989, Ser. No. 303,326

Int. Cl.[5] A61B *17/04*

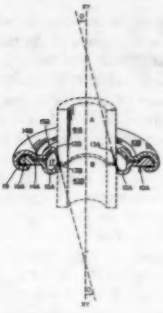
U.S. Cl. 606—150 **20 Claims**

1. An anastomosis device for interconnecting the ends of first and second tubular organs, the device comprising first and second members, each member including:

(i) an outer region having a contact surface engagable

against the contact surface of the other member and disposed about a central axis, the central axis of each of said members being coincident when the contact surfaces are engaged with one another;

(ii) an inner region disposed concentrically within the outer region and including an opening located concentrically therein for receiving the end of said tubular organ; and



(iii) a series of pins, each pin having a base, said pins being mounted at their bases in the inner region, disposed around the periphery of the opening and nearly parallel to the central axis so that the exposed ends thereof approximately define a plane, for holding said ends of said tubular organ inserted into said opening;

so that anastomosis may be achieved.

4,930,503

STAPLING PROCESS AND DEVICE FOR USE ON THE MESENTERIES OF THE ABDOMEN

J. Crayton Pruitt, 360 Coffee Pot Riviera NE., St. Petersburg, Fla. 33704

Continuation-in-part of Ser. No. 237,433, Aug. 26, 1988, Pat. No. 4,848,637, which is a continuation-in-part of Ser. No. 60,469, Jun. 11, 1987, abandoned, which is a continuation-in-part of Ser. No. 864,336, May 19, 1986, abandoned. This application May 12, 1989, Ser. No. 350,758

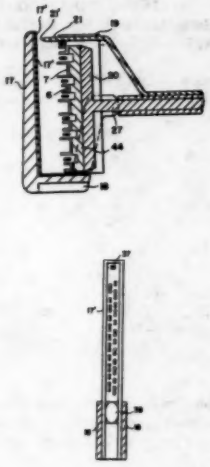
Int. Cl.[5] A61B *17/04*; B31B *1/00*

U.S. Cl. 227—178 **28 Claims**

1. A process for preparing a mesentery of the abdomen for subsequent removal of at least a portion of the bowel comprising the step of preventing the flow of blood from blood vessels leading to the section of the bowel to be removed comprising the step of applying staples across at least a portion of the web of the mesentery, said staples comprising an arrangement of staples of different sizes selected from the group consisting of:

(a) two adjacent parallel rows of staples having the staples in each row alternating in size, with the staples in one row staggered with the staples in the other adjacent row, the smaller sized staples being long enough to bridge the gap between staples and to overlap at least a portion of the two adjacent staples and the larger sized staples having a length in the range of at least 30 percent larger than said smaller staples and up to a length sufficient to overlap the entire length of the smaller staple plus the two adjacent gaps between staples and at least a portion of each of the adjacent longer staples in the adjacent parallel row of staples, and

(b) two parallel rows of identically sized staples, the staples in one of said rows being staggered with the staples in the other row, and also a third row of staples parallel to said first two rows of staples and having a dimension in the main portion thereof different from the dimension of the main portion of the staples in said first two rows, there being at least 30 percent difference in said dimension sizes, in which said three rows of staples the middle row of



staples is positioned approximately equidistant between the other two rows of staples.

4,930,504

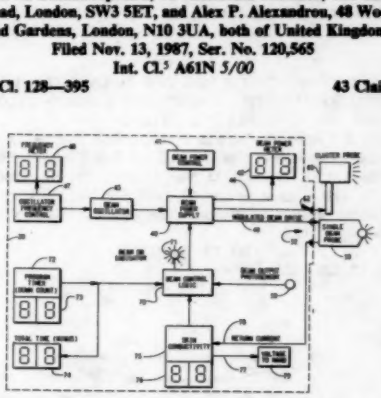
DEVICE FOR BIOSTIMULATION OF TISSUE AND METHOD FOR TREATMENT OF TISSUE

Costas A. Diamantopoulos, 31 Alexandra Mansion, 333 Kings Road, London, SW3 5ET, and Alex P. Alexandrou, 48 Woodland Gardens, London, N10 3UA, both of United Kingdom

Filed Nov. 13, 1987, Ser. No. 120,565

Int. Cl.[5] A61N *5/00*

U.S. Cl. 128—395 **43 Claims**



1. A device for biostimulation of tissue comprising:

an array of substantially monochromatic radiation sources, said array comprising:

at least one such radiation source providing a first wavelength less than 830 nm;

at least one such radiation source providing a second wavelength greater than or equal to 830 nm and less than 900 nm; and

at least one such radiation source providing a third wavelength greater than or equal to 900 nm;

said radiation sources being arranged such that at least two radiation wavelengths among said first, second and

third wavelengths simultaneously pass directly or indirectly through a single point located within said tissue.

4,930,505

METHOD OF ENHANCING THE WELL-BEING OF A LIVING CREATURE

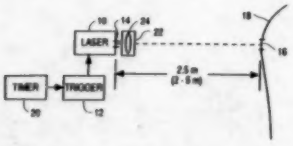
Guenther H. Hatje, Hamburg, Fed. Rep. of Germany, assignor to Helmut K. Pinsch GmbH & Co., Hamburg, Fed. Rep. of Germany

Filed Oct. 5, 1987, Ser. No. 105,608

Claims priority, application European Pat. Off., Oct. 4, 1986, 86113792.5

Int. Cl.[5] A61N 5/00

U.S. Cl. 128—398 **8 Claims**



1. A therapeutic method for the body of a horse, comprising:

irradiating a target area on the body of a horse with a source of laser light having a wavelength of approximately 904 nm,

limiting the radiation dosage by triggering the source for approximately 10 ns to 15 ns to produce emission of the light

controlling the area over which the source irradiates the area with an optical system that forms a 10 mm×10 mm target area and controls the beam path length from a few mm to 5 m through an emergence area of 0.3 mm×0.3 mm, and

establishing the radiant power applied to the target to between 50 W and 350 W.

4,930,506

COMBINED SENSOR FOR THE TRANSCUTANEOUS MEASUREMENT OF OXYGEN AND CARBON DIOXIDE IN THE BLOOD

Georg J. Ullrich, Freiburg im Breisgau, Fed. Rep. of Germany, assignor to Hellige GmbH, Freiburg, Fed. Rep. of Germany

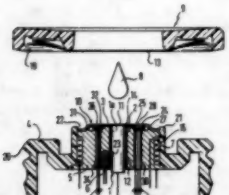
Division of Ser. No. 121,713, Nov. 17, 1987, Pat. No. 4,840,179.

This application Apr. 19, 1989, Ser. No. 340,339

Claims priority, application European Pat. Off., Nov. 17, 1986, 86115941.6

Int. Cl.[5] A61B 5/00

U.S. Cl. 128—633 **4 Claims**



1. A sensor element for simultaneous, continuous, transcutaneous measurement of the partial pressure of carbon dioxide and the oxygen saturation in the blood of a living body, said sensor element comprising:

a housing having a planar measuring surface;

a membrane permeable to carbon dioxide, sealably disposed about the measuring surface, said membrane having inner and outer surfaces;

two light emitting diodes embedded in the measuring surface each emitting light of different wave lengths and positioned so that the emitted light beams do not mutually interfere;

photoelectric receiving means embedded in the measuring surface;

a thin layer of electrolyte disposed between the measuring surface and the inner surface of the membrane;

a third light emitting diode and an adjacent photoelectric receiving unit in the measuring surface;

an intermediate layer of color indicator in the measuring surface which covers said third light emitting diode and said adjacent photoelectric receiving unit;

whereby when the outer surface of the membrane is brought into contact with the skin, carbon dioxide diffuses through the membrane changing the pH of the electrolyte solution, which changes in pH alters the light absorption or light reflection properties of said layer of color indicator and is detected by diffusing the light emitted from the third light emitting diode through the skin and detecting it by the adjacent photoelectric receiving unit under the color indicator layer and whereby the light emitted from the two light emitting diodes after diffusion through the skin is detected by the photoelectric receiving means and the oxygen saturation of the blood is determined by the principle of pulse oximetry.

4,930,507

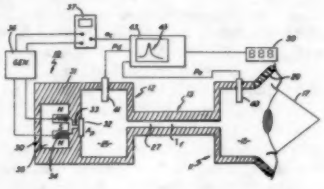
DOUBLE CHAMBER ACOUSTICAL TONOMETER

Edward J. Krasnicki, Skaneateles, N.Y., and Donald L. Margolis, Davis, Calif., assignors to Welch Allyn, Inc., Skaneateles Falls, N.Y.

Filed Sep. 23, 1988, Ser. No. 248,148

Int. Cl.[5] A61B 8/10

U.S. Cl. 128—649 **17 Claims**



1. Apparatus for monitoring the resonant behavior of a in-vivo eye to determine the compliance of the eye that includes

an enclosed ocular chamber having an unobstructed opening in which a target eye is positionable and an acoustical seal surrounding the opening,

an enclosed drive chamber having an acoustical generator associated with said drive chamber to produce acoustical waves within the chamber over a given range of frequencies,

an inertia tube connecting the two chambers whereby pressure fluctuations produced in the drive chamber are transmitted into the ocular chamber to excite the eye,

a first sensor means in the ocular chamber for sensing the pressure in said ocular chamber,

a second sensor means in the drive chamber for sensing the pressure in said drive chamber, and

analyzer means connected to both sensor means for comparing the two chamber pressures over the given range of frequencies and providing an output indicative of the resonant response of the apparatus from which the com-

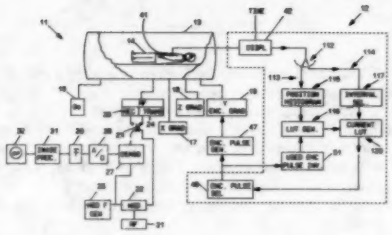
pliance of the eye can be determined from the peak resonant response frequency.

4,930,508

REDUCING RESPIRATORY MOTION ARTIFACTS IN NUCLEAR MAGNETIC RESONANCE IMAGES

Yair Shimoni, and Bilha Nissenson, both of c/o Elscint Ltd., P.O.B. 550, Haifa, Israel (31004)

Filed Apr. 5, 1988, Ser. No. 177,699
Claims priority, application Israel, Apr. 10, 1987, 82184
Int. Cl.[5] A61B *5/05*
U.S. Cl. 128—653 A **14 Claims**



11. A system for reducing respiratory motion artifacts in nuclear magnetic resonance (NMR) images, said system comprising:

(a) NMR means for scanning a subject,

(b) sensor means for measuring thorax displacement during respiration cycles of the subject,

(c) means for determining the average respiration cycle of the subject based on the measurement of the thorax displacement during a plurality of respiration cycles,

(d) means for dividing the average respiration cycle into a number of intervals,

(e) means for assigning encoding pulse characteristics to each of the intervals,

(f) said sensor means measuring the thorax displacement in the respiration cycle when an encoding pulse is required by the NMR means during a scan of the subject,

(g) means for selecting the present interval of the average respiration cycle that includes the measured thorax displacement in the respiration cycle of the subject when the encoding pulse is required,

(h) means for determining a specific encoding pulse characteristic to be used during the scan of the subject according to the selected interval at the time the encoding pulse is required said specific encoding pulse characteristic defining a specific phase,

(i) said means for determining the encoding pulse characteristic comprises a look-up table comprising intervals corresponding to encoding pulse characteristics, and

(j) means for decreasing the number of intervals by increasing the displacement range of the intervals in the look-up table and for assigning unused encoding pulse characteristics to the decreased number of intervals to increase the probability of having an unused encoding pulse characteristic in each selected interval.

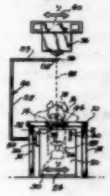
4,930,509

X-RAY AIMING FIXTURE

Alfred G. Brisson, Kildeer, Ill., assignor to Northgate Research, Inc., Arlington Heights, Ill.

Filed Jan. 23, 1989, Ser. No. 300,370
Int. Cl.[5] A61B *6/00, 17/22*
U.S. Cl. 128—653 **8 Claims**

1. A lithotripter having an x-ray aiming system and comprising a table for supporting a patient having a kidney stone, said table having an opening therein with the patient located on said table so that the kidney stone is disposed above said opening, support means disposed below said table and being horizontally movable, a shock wave generator supported by said support means and including an upwardly opening truncated ellipsoidal reflector with a vertical axis and having a spark gap at the first focus point of the ellipsoidal reflector with the second focus point of the ellipsoidal reflector to coincide with the kidney stone, said support means being horizontally movable to align said vertical axis with the kidney stone, means for disposing an x-ray film in alignment with said table opening, x-ray apparatus disposed above said table and aligned with said



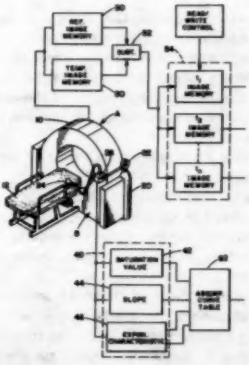
opening for cooperating with the x-ray film to produce an x-ray picture, an x-ray opaque aiming member, means supporting said x-ray opaque aiming member from said first mentioned support means below said x-ray apparatus to produce a shadow on an x-ray picture, said x-ray opaque aiming member being fixed in alignment with said reflector vertical axis, said x-ray opaque aiming member thus shadowing said kidney stone when said vertical axis passes through said kidney stone and displaying in the event of misalignment how far and in what direction said supporting means must be moved to effect such shadowing and alignment.

4,930,510

PARAMETERIZATION FOR CT BLOOD FLOW MAPPING WITH XENON GAS ENHANCEMENT

Walter W. Lindstrom, Shaker Hts., Ohio, assignor to Picker International, Inc., Highland Hts., Ohio

Continuation-in-part of Ser. No. 933,781, Nov. 24, 1986, Pat. No. 4,793,357. This application Nov. 23, 1988, Ser. No. 275,785
The portion of the term of this patent subsequent to Dec. 27, 2005, has been disclaimed.
Int. Cl.[5] A61B *6/00*
U.S. Cl. 128—654 **18 Claims**



1. An apparatus for creating images representing partition

coefficient and blood flow rates in a region of interest of a subject, the apparatus comprising:

an enhancement agent means for introducing an enhancement agent into a subject's blood;

a means for providing an indication of the concentration of the enhancement agent within the blood over time;

an absorption curve projecting means for projecting an absorption curve indicative of enhancement agent absorption in the blood over time;

an imaging means for generating a plurality of time displaced electronic image representations of at least the region of interest, each image representation including a plurality of pixel values, each pixel value being indicative of enhancement agent concentration in a corresponding subregion of the region of interest;

a partition coefficient and blood flow rate determining means for determining partition coefficients and blood flow rates from the pixel values and the projected absorption curve for subregions of the region of interest corresponding to the pixel values;

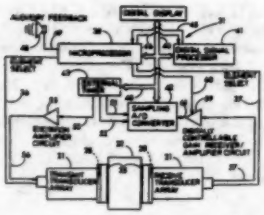
a means for assembling the detemined partition coefficients and blood flow rates into images representing partition coefficient and blood flow rates in the region of interest.

4,930,511

ULTRASONIC DENSITOMETER DEVICE AND METHOD

Phillip J. Rossman, Madison, and Scott A. Wiener, Mt. Horeb, both of Wis., assignors to Lunar Radiation, Inc., Madison, Wis.

Filed May 11, 1988, Ser. No. 193,295
Int. Cl.[5] A61B *8/00*
U.S. Cl. 128—661.03 **23 Claims**



1. A method for measuring the physical properties and integrity of a member in vivo, comprising the steps of:

(a) adjusting the distance between a pair of ultrasonic transducers to correspond to the size of the member;

(b) fixing the distance between the ultrasonic transducers;

(c) transmitting an acoustic signal between the transducers through the member;

(d) determining a member transit time of the acoustic signal through the member;

(e) placing the transducers in a standard inanimate homogenous material of known acoustic properties with the distance between the transducers remaining fixed;

(f) transmitting an acoustic signal through the standard material;

(g) determining a standard material transit time of the acoustic signal through the standard material;

(h) making a mathematical time comparison of the member transit time to the material transit time; and

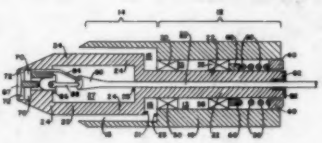
(i) relating the mathematical time comparison to the physical properties of the member.

4,930,512

HAND HELD SPRING-LOADED ULTRASONIC PROBE

William Henriksen, Hauppauge; Louis Katz, Flushing, and David G. Wuchinich, New York, all of N.Y., assignors to Sonomed, Inc., Lake Success, N.Y.

Filed Jun. 16, 1988, Ser. No. 207,675
Int. Cl.[5] A61B *8/10*
U.S. Cl. 128—661.06 **40 Claims**



1. A hand held apparatus for uniformly biasing a transducer assembly against a human eye comprising:

an outer housing adapted to be hand held;

an inner housing slidably insertable into said outer housing and movable between an extended position for contact with said eye and a retracted position with respect to said outer housing for protective storage thereof;

means for biasing said inner housing into said extended position;

a transducer for contacting an eye for conducting measurements thereof; and

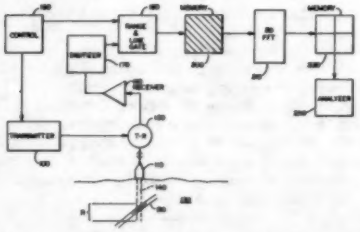
means for holding said transducer, said holding means and transducer being provided on a front portion of said inner housing for emitting and receiving ultrasonic energy from said eye when said inner housing is in said extended position, said biasing means providing biasing forces less than that which would cause deformation of said eye when said eye is contacted with said transducer to avoid applanation thereof while said measurements are conducted.

4,930,513

TWO DIMENSIONAL PROCESSING OF PULSED DOPPLER SIGNALS

William T. Mayo, Seal Beach, and Paul M. Embree, Irvine, both of Calif., assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jul. 26, 1988, Ser. No. 224,106
Int. Cl.[5] A61B *8/00*
U.S. Cl. 128—661.09 **16 Claims**



1. A method for measuring velocity components of a fluid within a region of an object, comprising the steps of:

transmitting a periodic train of pulses of ultrasound energy in a single direction through the region of the object;

receiving echo signals which represent echoes of said pulses which are back-scattered from said region;

sampling the amplitude of said received signals using a sampling frequency which is greater than twice the highest frequency of the echoes;

taking a two dimensional discrete Fourier transform of said

samples with respect to a first fast-time variable which measures sampling periods, and a second slow-time variable which measures pulse repetition periods, whereby the echo signals from the moving fluid are mapped as an ellipse into a two-dimensional Fourier frequency space; and

determining velocity components in said region, along the propagation direction of said ultrasound energy by measuring the angle between the major axis of said ellipse and coordinate axes of said Fourier frequency space.

4,930,514

ULTRASONIC IMAGING APPARATUS

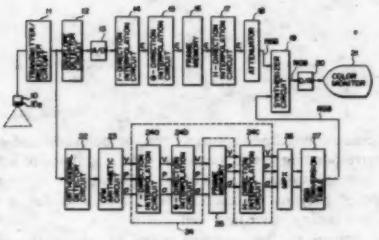
Tatsuro Baba; Ryoichi Kanda, and Yasutsugu Seo, all of Ootawara, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Aug. 4, 1988, Ser. No. 228,195

Claims priority, application Japan, Aug. 12, 1987, 62-201245

Int. Cl.[5] A61B *8/06*

U.S. Cl. 128—661.09 **16 Claims**



1. An ultrasonic imaging apparatus comprising:

ultrasonic transducer means for emitting ultrasonic pulses at a rate frequency fr and converting echo waves of said ultrasonic pulses into echo signals;

Doppler data output means for receiving the echo signals from said ultrasonic transducer means, for obtaining Doppler data from said echo signals and providing color Doppler data;

interpolating means for receiving said color Doppler data from said Doppler data output means and interpolating said color Doppler data according to a predetermined algorithm to provide interpolation data, and to exclude interpolation data corresponding to a zero region between $+fr/2$ and $-fr/2$ when the frequency of the received color Doppler data is above $+fr/2$ or $-fr/2$; and

means for displaying said color Doppler data and said interpolation data obtained from said interpolating means as a color image.

4,930,515

ULTRASOUND PROBE WITH MULTI-ORIENTATION TIP-MOUNTED TRANSDUCER

Richard A. Terwilliger, San Ramon, Calif., assignor to Diasonics, Inc., Milpitas, Calif.

Filed Oct. 4, 1988, Ser. No. 253,128

Int. Cl.[5] A61B *8/12*

U.S. Cl. 128—662.06 **32 Claims**

1. A probe comprising:

a probe housing;

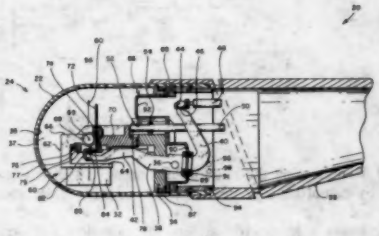
a transducer capable of at least one of sending and receiving a signal;

means for pivotally mounting said transducer;

means for pivoting said transducer so that the signal of the transducer describes a signal plane relative to the lengthwise axis of said probe housing as the transducer pivots lengthwise;

means for rotationally mounting said pivotally mounting means so as to describe a plane of rotation perpendicular to said signal plane and relative to the lengthwise axis of said probe housing;

wherein said pivotally mounting means includes means for allowing said transducer to be pivoted through said plane of rotation;



means for operably connecting said transducer pivoting means to said pivotally mounting means;

means for rotating said rotationally mounting means and said pivotally mounting means while said transducer pivoting means pivots said transducer, such that said signal plane described by the pivoting transducer rotates.

4,930,516

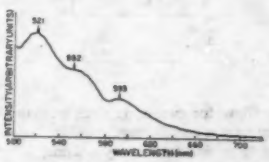
METHOD FOR DETECTING CANCEROUS TISSUE USING VISIBLE NATIVE LUMINESCENCE

Robert R. Alfano, and Michele A. Alfano, both of 3777 Independence Ave., Bronx, N.Y. 10463

Continuation of Ser. No. 796,859, Nov. 13, 1985, abandoned. This application Apr. 25, 1988, Ser. No. 186,747

Int. Cl.[5] A61B *5/00*

U.S. Cl. 128—665 **9 Claims**



1. A method for determining if tissue is cancerous comprising:

a. exciting a tissue to be examined with a beam of light, and

b. comparing the visible native luminescence emitted from the tissue with the visible native luminescence emitted from tissue whose condition is known.

4,930,517

METHOD AND APPARATUS FOR PHYSIOLOGIC SYSTEM IDENTIFICATION

Richard J. Cohen, Waban; Marvin L. Appel, Cambridge, and Ronald D. Berger, Brookline, all of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Apr. 25, 1989, Ser. No. 343,404

Int. Cl.[5] A61B *5/02*

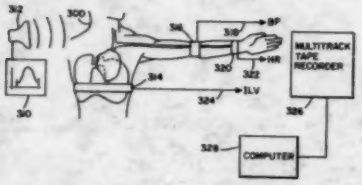
U.S. Cl. 128—671 **42 Claims**

1. A method for analyzing a biological or physiological system comprising the steps of:

A. Applying at least one exogenous broad-band perturbation to said physiological or biological system;

B. Measuring m signals from the biological or physiological system;

C. Transforming the m signals to generate a new set of n signals where n may be greater than, equal to or less than m;



D. Representing the relationships between the new signals by causal transfer functions and additive noise sources; and

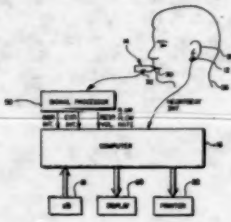
E. Using a parametric system identification technique to characterize quantitatively at least two causal transfer functions and the noise sources.

4,930,518

SINUS ARRHYTHMIA MONITOR

William J. M. Hrushesky, 3123 James Ave. South, Minneapolis, Minn. 55408

Filed Sep. 26, 1988, Ser. No. 248,588
Int. Cl.[5] A61B 5/205
U.S. Cl. 128—671 **43 Claims**



1. In an apparatus for measuring sinus arrhythmia of a subject, the improvement comprising:

means for determining respiratory volume;

means for determining respiratory rate;

means for determining mean heart rate;

means for correcting a measurement of sinus arrhythmia as a function of respiratory volume, respiratory rate and mean heart rate.

4,930,519

METHOD OF GRAPHING CARDIOPULMONARY DATA

Catherine A. Anderson, Stillwater, and Jay O. Millerhagen, Little Canada, both of Minn., assignors to Medical Graphics Corporation, St. Paul, Minn.

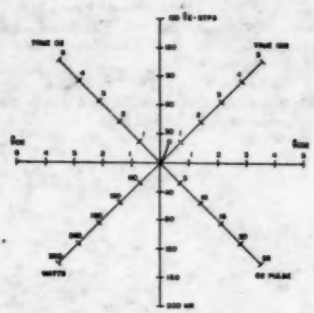
Continuation of Ser. No. 596,046, Apr. 2, 1984, abandoned. This application Sep. 9, 1985, Ser. No. 774,222
Int. Cl.[5] A61B 5/205
U.S. Cl. 128—671 **5 Claims**

1. A method for ascertaining the functional capacity of the cardio-respiratory system in the course of controlled exercise from measured cardio-respiratory data of living subjects by which key cardio-respiratory variables are readily located and distinctly displayed, comprising:

(a) plotting a plurality of regularly spaced axes intersecting at a center point, each of said axes being associated with a different preselected cardio-respiratory variable obtained during incremental stress testing;

(b) providing quantified scale markings on each of said axes at differing radial locations therealong, said scale markings being such that expected normal values of each of said variables will be generally an optimal distance from said center;

(c) locating the magnitude of the actual measured values of said cardio-respiratory variables for given workloads with respect to such scale markings on appropriate ones of said plurality of axes;



(d) constructing line segments from the points on said axes corresponding to said locations of the magnitude of actual measured values to that of an adjacent axis to form a closed polygon for each level of workload during the stress testing procedure; and

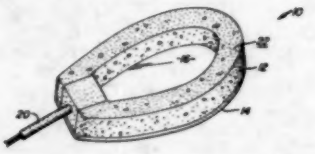
(e) following the line segments extending through the maximum measured value on one of said plurality of axes to the corresponding measured value on another of said plurality of axes for the same level of workload to determine the subject's anaerobic threshold and the onset of respiratory compensation.

4,930,520

EARPIECE FOR AUDITORY TESTING OF INFANTS

Maurizio Liverani, Stanford, Calif., assignor to Algotek, Inc., Redwood city, Calif.

Filed May 16, 1985, Ser. No. 735,423
Int. Cl.[5] A61B 5/12
U.S. Cl. 128—746 **16 Claims**



1. An earpiece for use in testing the hearing of an infant comprising:

a baffle forming a toroid shaped to encircle an ear of an infant and to conform to the side of an infant head;

a flat backing plate attached to and forming an enclosure on one side of the baffle for defining a cavity; and

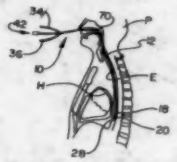
means for forming a passage into the cavity formed by said baffle and said backing plate for conveying acoustic energy to and from the cavity.

4,930,521

VARIABLE STIFFNESS ESOPHAGEAL CATHETER

William T. Metzger, 1760 Cass Ct., Libertyville, Ill. 60048, and Hossein Jadvar, c/o Medical Computer Laboratory University of Michigan, 4421 EECS Bldg., Ann Arbor, Mich. 48109-2122

Filed Mar. 17, 1989, Ser. No. 324,919
Int. Cl.[5] A61N *1/00*
U.S. Cl. 128—786 14 Claims



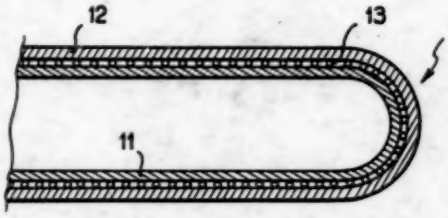
1. A variable stiffness esophageal catheter insertable into the esophagus of a subject via the nasal passages comprising:
an elongated, flexible body portion having a proximal end and a distal end;
a soft flexible tip carried on said distal end of said body portion; and
means for adjusting a stiffness characteristic of said body portion with said catheter deflectable in an angle on the order of ninety degrees and with said soft flexible tip minimizing trauma to adjacent nasal tissues.

4,930,522

PROPHYLACTIC DEVICE MADE OF RUPTURABLE MICROENCAPSULATED ELASTOMERIC MATERIAL AND PROCESS FOR ITS MANUFACTURE

René-Guy Busnel, Bievres, and Gilles Argy, La Queue en Yvelines, both of France, assignors to Hutchinson, Paris, France

Filed Aug. 15, 1988, Ser. No. 232,336
Claims priority, application France, Aug. 20, 1987, 87 11753
Int. Cl.[5] A61F *5/44*
U.S. Cl. 128—844 14 Claims



1. A prophylactic device, comprising: at least two layers of elastomeric material arranged one on top the other and microcapsules disposed between said two layers, said microcapsules having rupturable walls and containing therein at least one pharmacologically active substance.

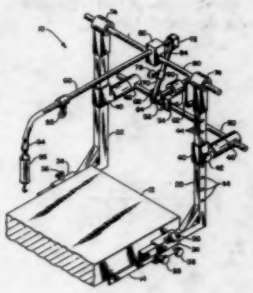
4,930,523

SURGICAL SHOULDER POSITIONING APPARATUS

Joseph P. Laico, New City, and Joseph L. Molino, Valley Cottage, both of N.Y., assignors to Lincoln Mills, Inc., New City, N.Y.

Filed Apr. 13, 1989, Ser. No. 337,333
Int. Cl.[5] A61F *13/00*
U.S. Cl. 128—845 17 Claims

1. A shoulder positioning apparatus comprising:
support means for providing a pair of laterally spaced support members;
mounting means for mounting said support means to an operating table for generally parallel upright disposition of said support members;
first crossbar means mounted to said support members at an intermediate position thereof comprising a first crossbar extending laterally relative to said support members;
manually operable drive means mounted to said first crossbar for variably displacing a positioning shaft; second crossbar means mounted to said support frames comprising a second crossbar extending laterally relative to said support members;



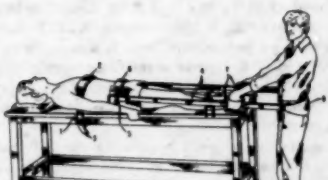
boom means mounted to said second crossbar comprising a boom generally transversely extending relative to said support members, said boom having a forward end and a rear end and a pivotal linkage connecting said rear end and said positioning shaft;
abduction sling means suspended from said boom for supporting said upper arm,
so that upon placing the arm of a patient in said abduction sling means, the forward end of said boom may be selectively raised and lowered by manual operation of aid drive means to abduct and thereby separate the shoulder of the patient.

4,930,524

DEVICE FOR LUMBAR TRACTION IN PHYSIOTHERAPY

Hendrikus C. W. van Zuilichem, van Zuilichem & Partners, Equipment Manual Therapy, P.O. Box 46, 4750 AA Oud Gastel, Netherlands

Filed Sep. 19, 1988, Ser. No. 246,075
Int. Cl.[5] A61F *13/00, 5/04;* A61H *1/02*
U.S. Cl. 128—876 6 Claims



1. A device for the physiotherapeutical treatment of intervertebral disfigurement diseases by uni- or polydimensional traction at the lumbar part of the spinal column and the pelvis of humans, comprising a table with a thoracal fixation belt (1) having an anatomically shaped widened chest part (2), said belt is affixed around said table and around the patient by adjust-

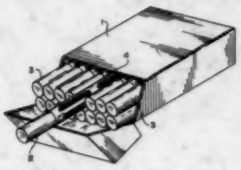
ment of an extension piece (3) of said belt (1), and with a traction part comprising a pelvical girdle (5) with an abdominal belt (6) that is affixed around the patients pelvis and abdomen respectively, said pelvical girdle (5) and said abdominal belt (6) being connected at each side with one of a pair of longitudinal traction belts (4), which extend towards the foot end of said table, and which are connected at said foot end by means of handle clamps (7) to a traction girdle (8), which can be slung around the therapist, standing at said foot end, said girdle (8) being connected to a connection rod (9), which has a traction rope (10) in the middle of a pulley block with a mechanical traction drive, wherein the patient is supported by means of an adjusting wedge that is positioned on the table and (11) laid under the body.

4,930,526

MILD CIGA STICK

Harlin Chen, and Jyh H. Lee, both of 6th Fl., 20, Lane 14 Gi-Lin Rd., (Fei Fong Building), Taipei, Taiwan

Filed Sep. 10, 1987, Ser. No. 94,901
Int. Cl.[5] A24B *3/06*
U.S. Cl. 131—290 2 Claims



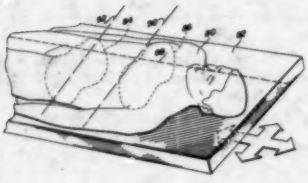
1. A cigarette filter comprising Bakuhan Stone.

4,930,525

METHOD FOR PERFORMING C.T. GUIDED DRAINAGE AND BIOPSY PROCEDURES

Aubrey M. Palestrant, 6800 N. 47th St., Paradise Valley, Ariz. 85253

Filed Mar. 28, 1989, Ser. No. 329,800
Int. Cl.[5] A61B *17/00*
U.S. Cl. 128—898 7 Claims



1. A method of guiding a catheter toward a target area within a patient's body in conjunction with a C.T. scanner, the catheter having a piercing tip, the C.T. scanner being adapted to project at least one transverse reference beam of light across the patient's body to indicate the location of the vertical plane through which the patient's body has been scanned, said method comprising the steps of:

(a) scanning the patient's body using the C.T. scanner to form a cross-sectional image of the target area within the patient's body;

(b) positioning the catheter to lie within the plane of the transverse reference beam before inserting the piercing tip into the patient's body;

(c) directing the piercing tip of the catheter at the target area; and

(d) advancing the piercing tip of the catheter into the patient's body while maintaining the catheter within the plane of the transverse reference beam.

4,930,527

HAIR ORNAMENT AND METHOD OF MAKING THE SAME

Kozoh Makishima, and Kyoko Makishima, both of No. 3-35, Ohizumi Gakuen-cho 6-chome, Nerima-ku, Tokyo, Japan

Filed Feb. 26, 1988, Ser. No. 161,063
Claims priority, application Japan, Mar. 2, 1987, 62-45210
Int. Cl.[5] A41G *3/00*
U.S. Cl. 132—201 8 Claims

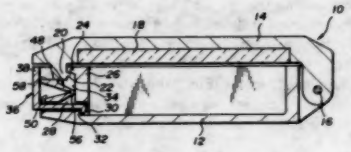
1. A hair ornament having an inside for contact with a wearer's head and an outside and comprising a plurality of spaced strands each composed of a number of gradually curled synthetic fibers laid parallel to each other, each of said fiber strands having a formed portion in which fibers extending toward one end thereof are spaced horizontally and bent while being partly overlapped, said formed portions of said fiber strands being partly superimposed on formed portions of adjacent fibers and arranged to shape and hold said plurality of spaced fiber strands into a bowl-shaped configuration, said formed portions of said fiber strands including adjacent fibers fixed to each other solely by an adhesive applied over fibers of said fiber strands of the entire area of said hair ornament so as to maintain said hair ornament in said bowl-shaped configuration with said fibers and said strands exposed on the inside and outside of said hair ornament, said inside fibers and strands being exposed on the inside of said hair ornament for contact with the wearer's head.

4,930,528

VANITY CASE

Yoshiharu Hatakeyama, Tokyo, Japan, assignor to Yoshida Industry Co., Ltd., Tokyo, Japan

Filed Mar. 18, 1988, Ser. No. 168,320
Int. Cl.[5] A45D 42/02
U.S. Cl. 132—301 9 Claims



1. A vanity case comprising:

a receptacle member for containing cosmetic material;

a cover member hinged with said receptacle member at respective rear ends thereof;

a recess formed in the front end of said receptacle member;

a first latch tongue formed on said cover member;

a second latch tongue formed on said receptacle member at a position within said recess;

said first and second latch tongues being engaged with each other by snap action when said cover member is closed over said receptacle member, thereby maintaining said cover member in a closed position with respect to said receptacle member; and

a push piece disposed within said recess and being movable therein backwardly and forwardly, said push piece having a front wall and an arm member integrally formed with said front wall through a first flexible section, said arm member extending upwardly from said first flexible section toward the lower surface of said cover member and including a lower half and an upper half extending in a reverse direction with respect to said lower half, said lower and upper halves being integrally joined together at a second flexible section, said lower half extending from said first flexible section toward an inner wall defining said recess and said upper half extending from said second flexible section toward said front wall of said push piece, the upper end of said arm member being positioned closely adjacent said lower surface of said cover member in said closed position of said cover member, said second flexible section being in contact with said inner wall of said recess, and inward movement of said push piece causing said lower half to swing about said first flexible section to thereby raise the position of said second flexible section while causing said upper half to swing about said second flexible section, whereby said upper end of said arm member forces said lower surface of said cover member in an upward direction to release engagement between said first and second latch tongues.

4,930,529

CUTICLE TREATMENT DEVICE AND METHOD

James H. S. Whitney, 114 Fairway Dr., Harrisonburg, Va. 22801

Filed May 16, 1988, Ser. No. 203,054
Int. Cl.[5] A45D 29/00
U.S. Cl. 132—73 18 Claims

1. Cuticle treatment apparatus comprising:

a manicuring instrument comprising an elongated shaft having opposed first and second ends and first and second blades extending from said first and second ends, respectively and

first and second cover means for removably covering said first and second blades, respectively, said first and second

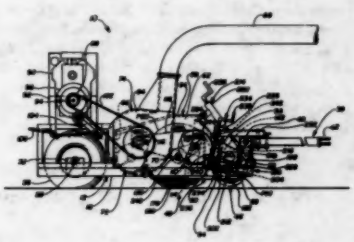
cover means being made from an absorbent material and being impregnated with a skin moisturizer.

4,930,530

LEAF LOADING METHOD

John B. Crego, New Holland; Ronald T. Sheehan, and Robert M. VanGinhoven, both of Lancaster, all of Pa., assignors to Ford New Holland, Inc., New Holland, Pa.

Division of Ser. No. 111,468, Oct. 22, 1987, Pat. No. 4,771,504.
This application Aug. 5, 1988, Ser. No. 228,427
Int. Cl.[5] B08B 7/00
U.S. Cl. 134—6 9 Claims



1. A leaf loading method comprising the steps of:

picking up leaves from the ground by operating a rotary beater having a plurality of lifting elements and a rotary broom having a plurality of bristles;

delivering leaves between said beater and said broom by rotating said beater and said broom in opposite directions;

guiding leaves from between said beater and said broom toward an auger disposed rearwardly of said broom;

transferring leaves from said auger into a thrower by rotating said auger; and

discharging leaves by operating said thrower.

4,930,531

DEVICE FOR CLEANING THE INSIDE OF A CONTAINER WITH A JET OF LIQUID

Patrick J. Ballu, Reims, France, assignor to Tecnoma, France

Filed Dec. 9, 1988, Ser. No. 282,270
Claims priority, application France, Dec. 10, 1987, 87 17216
Int. Cl.[5] B08B 9/08
U.S. Cl. 134—167 R 7 Claims

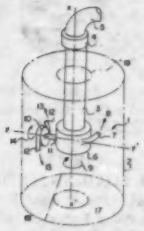
1. A device for projecting a fluid onto the inner surfaces of a container, comprising:

at least one nozzle capable of projecting a jet of the said fluid onto the said inner surfaces of the container, the said nozzle being mounted on a rotor capable of rotating about

a first axis yy', the nozzle being oriented so that the jet of fluid is tangential to the said first axis, such that the reaction of the jet causes the rotor to rotate about the said axis;

a hollow rotating head accommodating the said axis yy' and capable of rotating about a second axis xx' which meets the first axis at an angle other than zero, the rotating head being provided with an auxiliary spout oriented so as to produce a jet of fluid tangential to the said second axis, such that the reaction of this jet causes the rotating head to rotate about the said axis;

a hollow support, which may be fixed relative to the container, accommodates the said first axis of the rotating



head, the said support being capable of acting as a pipe for supplying the fluid intended for the said spout and the said nozzle;

at least one sealing surface provided on the rotor so as to cooperate with a corresponding sealing surface provided on the rotating head,

wherein the sealing surface provided on the rotor and/or the corresponding sealing surface provided on the rotating head has a helical or spiral groove, the shape of which is chosen so that, when the rotor rotates owing to the action of the jet of liquid projected by the nozzle, the said groove conveys the liquid towards the inside of the rotating head and forms a dynamic seal.

4,930,532

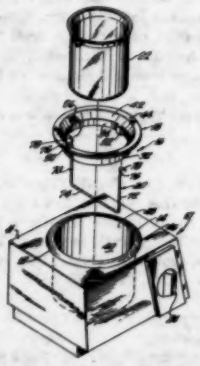
BEAKER HOLDER FOR USE WITH ULTRASONIC CLEANING DEVICE

Stanley E. Mayer, Bronx, N.Y., assignor to IPCO Corporation, White Plains, N.Y.

Filed Feb. 17, 1989, Ser. No. 312,033

Int. Cl.[5] B08B *3/10*

U.S. Cl. 134—184 **28 Claims**



28. A beaker holder for supporting a beaker for cleaning, medical or dental tools, or the like, in an ultrasonic cleaning device having a liquid-filled container, the holder comprising:

a ring-shaped member receiving a beaker and adapted to fit on an edge of the container of the cleaning device; and

a support member removably-attachable to said ring-shaped member and downwardly depending therefrom and adapted to hold said beaker so that said beaker rests on said support member when the holder is inserted in said container, said support member including a wire element having two parallel legs provided with two finger portions outwardly extending from said legs in opposite directions and a base portion connecting said legs to each other,

said ring-shaped member including two diametrically opposing slots, said two outwardly extending finger portions being removably insertable into said slots.

4,930,533

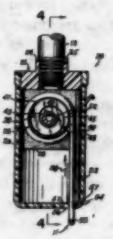
UMBRELLA WITH RETRACTABLE CARRYING STRAP

James H. Allen, Covington, Ky., assignor to 'totes' Incorporated, Loveland, Ohio

Filed Oct. 17, 1988, Ser. No. 258,818

Int. Cl.[5] A45B *25/00*

U.S. Cl. 135—20 R **20 Claims**



1. An umbrella, comprising:

a cover adapted to be opened and closed between use and storage positions, respectively;

a centerpost having first and second ends, said cover being connected to the first end of said centerpost;

a handle defining a hollow interior and having inner and outer ends, said handle being sized and configured for gripping by a user's hand and further having an opening in the outer end, the inner end of said handle being connected to the second end of said centerpost;

a carrying strap being sized and configured for gripping by a user's hand; and

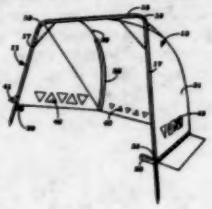
retraction means located within the hollow interior of said handle and being connected to one end of said carrying strap for moving said carrying strap from an extended position to a retracted position, said carrying strap being stored within the hollow interior of said handle when in the retracted position and being located exteriorly of said handle when in the extended position, said carrying strap being retractable into and extendible from the hollow interior through the opening in the outer end of said handle to either the retracted position for storing said carrying strap or the extended position for carrying said umbrella via said carrying strap, respectively, irrespective of whether said cover is in an opened or closed position.

4,930,534

FOLDABLE SHELTER

Peter M. Hill, 39 Carnarvon Street, East Victoria Park, Australia

Filed Jul. 14, 1988, Ser. No. 219,099
Claims priority, application Australia, Jul. 16, 1987, PI3176
Int. Cl.[5] E04H *15/00*
U.S. Cl. 135—102 13 Claims



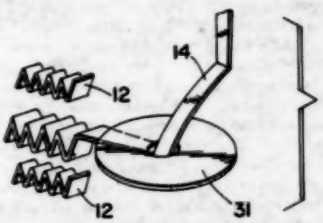
1. A foldable shelter consisting of a frame consisting of an arch including a bridge portion extending substantially horizontally when said shelter is erected and a pair of leg portions one at each end of said arch and forming with said bridge a generally inverted U-shaped opening when erected, a flexible covering attached to said arch and arranged to extend to one side of said arch and having a bottom edge positioned adjacent the ground when erected, and a pair of struts each extending from and affixed to said bridge portion of said arch to a respective bottom edge of said covering and being flexed by a tensile member connected between the bridge portion of the arch and the bottom edge of the covering, the struts cooperating with said flexible covering to maintain said covering in a state of tension when the shelter is in an erected condition and to give form and shape to said covering, for providing a sheltered area, said arch and said struts consisting of the sole support for said covering.

4,930,535

FOLDING LEAF VALVE AND METHOD OF MAKING

Elizabeth A. Rinehold, Santa Barbara, Calif., assignor to McGhan Medical Corporation, Santa Barbara, Calif.

Continuation-in-part of Ser. No. 51,508, May 14, 1987, abandoned. This application Jun. 23, 1989, Ser. No. 372,222
Int. Cl.[5] F16K *15/00*
U.S. Cl. 137—15 4 Claims



1. A method of making a folding leaf valve comprising the steps of:

(a) placing a strip of lumen-forming releasing material A between two wider strips of raw elastomer to form a first laminate.

(b) layering onto both outer surfaces of said first laminate a releasing material B to form a second laminate,

(c) folding said second laminate over itself at least once; and

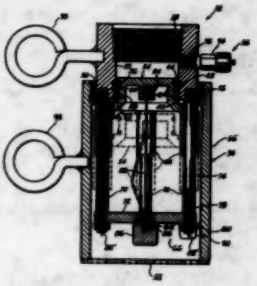
(d) heating said folded second laminate for a period of time sufficient to vulcanize all elastomer surfaces in contact with each other.

4,930,536

PIPELINE ROAD CROSSING SEALING SYSTEM

Julian S. Taylor, 8300 SW. 8th, Oklahoma City, Okla. 73128

Continuation-in-part of Ser. No. 353,570, May 18, 1989. This application Sep. 25, 1989, Ser. No. 411,766
Int. Cl.[5] F16K *17/14*
U.S. Cl. 137—70 10 Claims



1. In an elongated fluid conductor traversing a roadway in downward vertically spaced relation with respect to the roadway and loosely surrounded by a casing sealed at its respective end portions with the exterior of the conductor and forming an annulus around the conductor, said casing having a vent pipe at its respective end portions open to the atmosphere at opposite sides of the roadway, the improvement comprising:

relief valve means for normally closing the end of said vent pipes opposite said casing,

said valve means having valve head means connected with the respective said end of said vent pipes and having a valve seat opposite the pipe vent connection;

a valve sealing with said valve seat;

sleeve means for axially guiding said valve toward and away from said valve seat;

plate means for supporting said sleeve means;

a plurality of bolts connecting said plate means with said valve head means in axially spaced relation with respect to the valve; and,

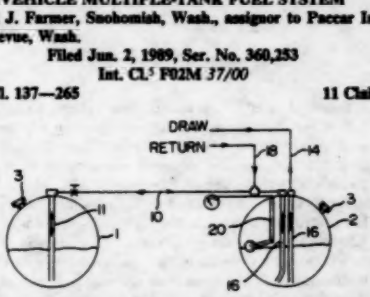
elongated pressure responsive pin means axially interposed between said valve and said plate means for normally maintaining said valve sealed with said seat.

4,930,537

VEHICLE MULTIPLE-TANK FUEL SYSTEM

Daniel J. Farmer, Snohomish, Wash., assignor to Paccar Inc., Bellevue, Wash.

Filed Jun. 2, 1989, Ser. No. 360,253
Int. Cl.[5] F02M *37/00*
U.S. Cl. 137—265 11 Claims



1. A multiple-tank fuel utilization system for an internal-combustion engine of a road vehicle, comprising:

spaced-apart primary and secondary fuel tanks;

a draw tube terminating at a lower end of the primary fuel tank;

a fuel drawing system for drawing fuel from said primary

tank comprising a draw line operatively connected only to the upper end of the draw tube of the primary tank and not operatively connected to the draw tube of the secondary tank and coupled to the engine of the vehicle;

a fuel transfer system for transferring fuel between said secondary tank and said primary tank comprising crossover tubes in each tank, said crossover tubes each having an upper end and a lower end, a crossover line coupling the upper ends of the crossover tubes and being positioned above the tanks, said crossover line and said crossover tubes providing a continuous passage between said primary and said secondary tank, said passage having two opposite openings, each said opening located below the fuel level of each said tank;

a vent located above the fuel level of each said tank to allow atmospheric pressure to equalize the fuel levels of each said tank, the fuel being transferred at all times between said secondary tank and said primary tank solely through said crossover line, the fuel transfer system being independent of the fuel drawing system; and

a return line coupled to at least one of said tanks.

4,930,538

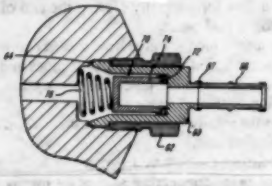
COMPACT MANIFOLD VALVE

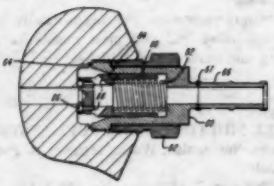
Ronnie Browne, Derry, N.H., assignor to Memron, Inc., Amherst, N.H.

Filed Jan. 17, 1989, Ser. No. 298,106

Int. Cl.[5] F16K *27/00*

U.S. Cl. 137—269 **11 Claims**





1. A manifold valve for use in a gas flow system, comprising:

manifold body means configured for coupling into the gas flow system for controlling fluid flow therethrough, said manifold body means having a plurality of fluid flow pathways formed internally therein;

operating valve means coupled to said manifold body means for controlling fluid flow through said plurality of fluid flow pathways of said manifold body means; and

means removably coupled to said manifold body means for interacting with the fluid flow through said plurality of fluid flow pathways of said manifold body means, said fluid flow interacting means including

cartridge means configured for interacting with the fluid flow through said manifold body means, said cartridge means including filter cartridge means for filtering particulates from the fluid flow therethrough and check valve cartridge means for precluding fluid backflow in a predetermined direction with respect to said manifold body means, and

cartridge holder means having a configuration for interchangeable, internal seating of said filter cartridge means and said check valve means in sealed combination therein, said cartridge holder means being further configured for removable coupling in sealed combination with said manifold body means;

said manifold body means including cartridge port means for removably coupling said cartridge holder means having at least one of said filter cartridge means and said check valve cartridge means internally seated in sealed combination therein in sealed combination with said manifold body means for controlling fluid flow through said manifold valve.

4,930,539

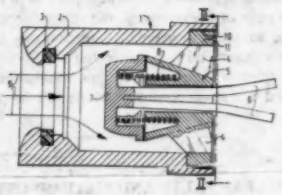
ANTI-FLUTTERING CHECK VALVE

Jacob van Rooy, Rheden, Netherlands, assignor to 501 Ocean B.V., Netherlands

Continuation of Ser. No. 534,768, Sep. 22, 1983, abandoned. This application Nov. 22, 1985, Ser. No. 801,384

Int. Cl.[5] F16K *15/06*

U.S. Cl. 137—514 **4 Claims**



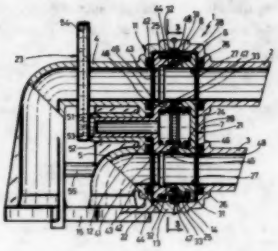
1. A flow-controlling valve construction including a hollow body adapted to pass a flowing fluid and defining an annular internal valve seat, a valve member having a head on one end thereof adapted to seat upon and close said valve seat in opposition to fluid flow through the hollow body and having an axially extending stem rigid therewith and projecting from the other end of the valve member, a support within said body and disposed in axially spaced relation to said valve seat so that when said head of the valve member is adjacent said support said head is maximally spaced from said valve seat, spring means interposed between said head and said support for normally urging said head toward seated relation with said valve seat in opposition to fluid flow through the hollow body, said support including wall means defining a bore freely, slidably receiving said stem so that when the head of the valve member is spaced both from said seat and said support, said head is supported solely by the stem in cantilever fashion from said support whereby lateral fluttering of said head and consequent chattering of the stem within the bore is possible due to fluid flow through the hollow body past the head, said stem being longitudinally split to provide at least two resilient bifurcations thereof and said bifucations being divergent in the direction from said head toward the free end of the stem so that said bifurcations are increasingly urged together as said head approaches said valve seat to bear internally against said wall means in increasing fashion as the head approaches the valve seat without destroying the free sliding relation of said stem in the support in any position of the head relative to he valve seat.

4,930,540

FLOW DIVERTER FOR A VEHICLE HEATING SYSTEM

Manrico Oddenino, Buttigliera, Italy, assignor to ITW-Fastex Italia, S.p.A., Turin, Italy

Filed Jun. 2, 1989, Ser. No. 360,685
Claims priority, application Italy, Jun. 7, 1988, 53206/88[U]
Int. Cl.[5] B60H *1/02*; F17D *3/00*
U.S. Cl. 137—599.1 12 Claims



1. A flow diverter for a vehicle heating system installed along a circuit conveying motor cooling water, characterized in that it comprises:

two structures (21 and 22) angularly fixed to each other and installed within a chamber (14) defined between two flanges (6 and 11), the first flange (6) of which accommodates an outlet of a first pipe (2) from which cooling water coming from said motor flows, and an outlet of a second pipe (3) which conveys said water back towards said motor preferably by means of a first radiator; and the second flange (11) of which accommodates an outlet of a third pipe (4) which conveys said cooling water toward a second radiator of said heating system, and an outlet of a fourth pipe (5) which receives said water back from said second radiator;

said structures (21 and 22) being rotatable between a first position in which there is a hydraulic connection between said first pipe (2) and said third pipe (4), and a hydraulic connection between said fourth pipe (5) and said second pipe (3), and a second position in which, inside said chamber (14), on one side thereof, said outlets of said third pipe (4) and said fourth pipe (5) are blocked, and on the other side thereof, there is a fluidic connection between said outlet of said first pipe (2) and said chamber (14), and between said chamber (14) and said outlet of said second pipe (3).

4,930,541

VARIABLE ORIFICE DIVERTER VALVE

Mark A. Solberg, Edgewood, Md., assignor to Morton Thiokol, Inc., Chicago, Ill.

Filed Feb. 10, 1989, Ser. No. 308,497
Int. Cl.[5] F16K *11/044*
U.S. Cl. 137—875 2 Claims

1. A variable orifice diverter valve comprising:

an elongated body assembly having a first end and a second end with a passageway extending therethrough from said first end to said second end,

a fluid inlet member having an orifice therein positioned at said first end of said body assembly in alignment with said passageway therein,

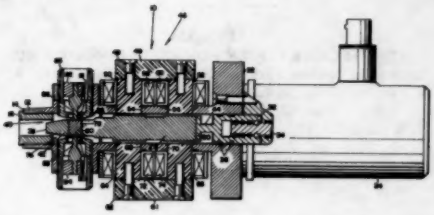
a pair of restrictors positioned in opposing relation with respect to said passageway at the first end of said body assembly, each of said restrictors having a connecting means associated therewith for the connection thereof to an individually associated outlet,

a torque motor positioned at the second end of said body assembly, said motor having a reversible drive shaft positioned in alignment with said passageway in said body assembly,

an elongated magnetic member positioned in the passageway in said body assembly, said magnetic member having a first end and a second end,

ball screw means including flexure means coupling the first end of said magnetic member to said drive shaft of said torque motor whereby operation of said motor causes fore and aft movement of said magnetic member,

the second end of said magnetic member being positioned between said restrictors in close spatial relation thereto, and



a coil assembly positioned on said body assembly in cooperative relation with said magnetic member and operative when energized to produce an electromagnetic field that pulls said magnetic member toward one or the other of said restrictors, sealing the restrictor it is pulled against and diverting the fluid flow entering the orifice of said inlet member through the other restrictor,

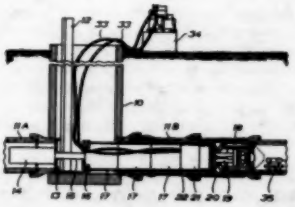
the second end of said magnetic member having a portion that is tapered and positioned in cooperative relation with the orifice in said fluid inlet member whereby fore and aft movement of said magnetic member controls the size of said orifice and the amount of fluid flow therethrough.

4,930,542

METHOD FOR RESTORING UNDERGROUND PIPELINES

Sigvard Winkle, and Henrik Persson, both of Malmö , Sweden, assignors to Entreprenadaktiebolaget E. & G. Jonsson, Malmo, Sweden

Continuation of Ser. No. 133,061, Sep. 15, 1987, abandoned. This application May 5, 1989, Ser. No. 349,894
Claims priority, application Sweden, Nov. 25, 1985, 8505539
Int. Cl.[5] F16L *1/00*
U.S. Cl. 138—98 3 Claims



1. Method for restoring underground pipeline by lining the existing pipeline with rigid short-pipes, comprising the steps of inserting into the pipeline from one end thereof an expansion piercer to be operated between an expanded condition of an outside dimension larger than the inside dimension of the pipeline, and a retracted condition of an outside dimension less than the inside dimension of the pipeline, said expansion piercer being in the retracted condition when being inserted into the

pipeline; operating the expansion piercer to the expanded condition in an expansion step, the piercer pressing against the inside surface of the pipeline and widening the pipeline; operating the expansion piercer to the retracted condition in a retraction step following said expansion step; displacing the expansion piercer in the pipeline in the direction from said one end of the pipeline in the retracted condition after the retraction step by pressing the short-pipes intermittently after a retraction step one after the other into the pipeline from said one end thereof to produce said displacement; and repeating the expansion and traction steps and the following displacement to create a pipe string from the trailing end of the expansion piercer to said one end of the pipeline by connecting a further short-pipe to a rear end of the resulting string of pipes.

4,930,543

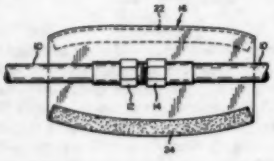
PROTECTIVE COVER FOR HOSE CONNECTORS

Eugene A. Zuiches, 2214 SE. 30th Ave., Portland, Oreg. 97214

Filed Nov. 25, 1988, Ser. No. 277,427

Int. Cl.[5] F16L *57/00, 58/18, 39/16*

U.S. Cl. 138—110 **1 Claim**



1. In combination,

a flexible hose having a connector portion therein,

said connector portion being enlarged relative to the hose;

a protective cover for said connector portion having inner and outer portions, opposite end edges, and defining side portions terminating in longitudinal side edges,

and a cushioning layer on the inner portion of said cover,

the outer portion of said cover having a substantially friction free outer surface,

said cover being wrapped fully around and fully covering said connector portion as well as hose portions adjacent to said connector portion,

the said defining side portions of said cover being disposed in overlapping relation,

and continuous and full length releasable securing means on overlapping areas of said defining side portions,

said side edges of said cover having a convex configuration along their full length to provide said cover with a widened portion intermediate the ends thereof for accommodating the enlarged connector portion and adjacent hose portions in a mounted position of the cover on said hose and for forming a wrapped structure tapered toward at least one end and thus capable of efficiently moving past obstacles when said hose is dragged longitudinally,

said cushioning layer protecting obstacles as said hose is dragged thereby and furthermore smoothing out the profile of the connector portion to contribute to efficient movement of the covered connector past the obstacles.

4,930,544

DOUBLE-CONTAINMENT THERMOPLASTIC PIPE ASSEMBLY

Christopher G. Zin, Charlestown, Mass., assignor to Asahi/America, Inc., Medford, Mass.

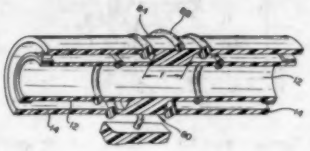
Division of Ser. No. 66,936, Jun. 25, 1987, Pat. No. 4,786,088.

This application Oct. 20, 1988, Ser. No. 260,444

Int. Cl.[5] F16L *9/18*

U.S. Cl. 138—113 **5 Claims**

1. A restraint coupling for a double-containment pipe assembly, said pipe assembly comprising a pair of spaced apart axially aligned inner carrier pipes of a first diameter and a pair of spaced apart axially aligned outer containment pipes of a second diameter, said second diameter being greater than said first diameter such that a generally annular space exists between the inner and outer pipes, said restraint coupling being formed from a thermoplastic material of unitary construction and comprising a continuous generally cylindrical containment portion defining a diameter substantially equal to the second diameter and having opposed axial ends for end-to-end axial alignment with the containment pipes, a generally cylindrical carrier portion defining a diameter substantially equal to the first diameter disposed within and generally parallel to said



containment portion, said carrier portion having opposed axial ends for end-to-end axial alignment with the carrier pipes, and a connecting portion rigidly extending between and connecting said containment and carrier portions, said containment and carrier portions having longitudinal lengths greater than the length of said connecting portion, said carrier portion extending in opposed axial directions from the connecting portion distances that are at least equal to distances by which the containment portion extends axially from the connecting portion, whereby the carrier portion and the containment portion of the restraint coupling can be fused in end-to-end relationship with carrier and containment pipes of the double-containment pipe assembly.

4,930,545

SAUSAGE CASING WITH IMPROVED UNIFORMITY OF DIAMETER

Klaus-Dieter Hammer, Mainz-Mombach; Hermann Winter, Wiesbaden-Biebrich, and Rolf Buettner, Huenstetten-Kesselbach, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt/Main, Fed. Rep. of Germany

Filed May 20, 1987, Ser. No. 51,773

Claims priority, application Fed. Rep. of Germany, May 24, 1986, 3617500

Int. Cl.[5] F16L *11/04*

U.S. Cl. 138—118.1 **7 Claims**

1. A tubular artificial sausage casing produced by a process comprising the steps of (a) supplying a fiber tube, (b) coating said fiber tube with viscose, (c) converting said viscose into regenerated cellulose to produce a fiber-reinforced cellulose hydrate gel tube, and (d) drying said gel tube while causing shrinkage longitudinally of about 2 to 10% and transverse expansion in said gel tube,

said casing having the property that, upon a treatment comprised of being soaked for 30 minutes in water at a temperature of about 40° C. to 50° C. and subsequently being cooled to room temperature, said casing undergoes an increase in length of about 0.8 to 2.5% and transverse shrinkage of about 2.5 to 5.2%, as compared to the length and diameter, respectively, of said casing in a dry state before said treatment, and wherein said coating step is performed by means of an annular nozzle and said transverse expansion is effected in such a manner that the flat width of said tube after said drying and after laying of said tube flat complies with the relationship:

$$FW = \frac{D_t \times \pi \times F}{2}$$

wherein:

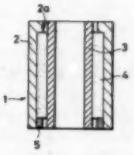
FW denotes said flat width, D_t is the diameter of said annular nozzle and F is an integer ranging between about 0.95 and 1.05.

4,930,546

HEAT-INSULATING METAL-CERAMIC STRUCTURE

Mitsuyoshi Kawamura, and Masato Taniguchi, both of Aichi, Japan, assignors to NGK Spark Plug Co., Ltd., Aichi, Japan

Filed Nov. 26, 1985, Ser. No. 801,962
Claims priority, application Japan, Nov. 27, 1984, 59-249990
Int. Cl.[5] F16L 9/14
U.S. Cl. 138—149 **5 Claims**



1. A heat-insulating tubular structure comprising:

a hollow outer tubular member comprised of metal;

a hollow inner tubular member comprised of a sintered ceramic material, the inner tubular member being coaxially aligned within said hollow outer tubular member, said inner and outer tubular members defining an annular space therebetween;

a heat-resistant powder, said powder compacted in the annular space between said hollow outer tubular member and said hollow inner tubular members and having a substantially uniform composition radially throughout the annular space, said powder binding said hollow inner tubular member to said hollow outer tubular member; and

means for retaining said compacted powder within said annular space.

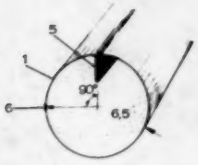
4,930,547

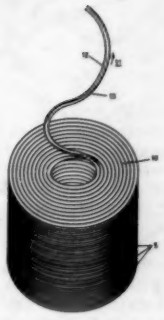
POWDER-FILLED WELDED STEEL TUBE AND METHOD FOR THE CONTINUOUS MANUFACTURE THEREOF

Arnold J. G. Dackus, Arnhem, Netherlands, assignor to Rijnstaal B.V., Arnhem, Netherlands

Continuation-in-part of Ser. No. 122,689, Nov. 19, 1987, abandoned. This application May 4, 1989, Ser. No. 348,087
Claims priority, application Netherlands, Nov. 28, 1986, 8603032
Int. Cl.[5] F16L 9/04
U.S. Cl. 138—171 **1 Claim**

1. A free steady coil of coiled powder-filled welded steel tubing to be uncoiled while standing in a free steady state, said tubing having in cross-section a radius and a wall thickness, said tubing being uncoilable with twisting along the axis of said free steady coil thereby imposing torsional stress on the tube, said tubing having a tube wall with a welded longitudinal closed seam and powder enclosing within the tube wall and a continuous longitudinal radial groove in the tube wall of depth greater than the thickness of the tube wall but less than said radius in cross-section of said tube, said groove defining a





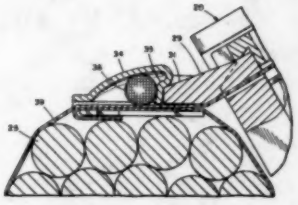
means for absorbing torsional stresses during uncoiling and preventing seam rupture.

4,930,548

BALL-LOCK TIE APPLICATION TOOL AND METHOD OF USE

James A. Turek, LaGrange, and Roy A. Moody, Flossmoor, both of Ill., assignors to Panduit Corp., Tinley Park, Ill.

Filed Sep. 14, 1989, Ser. No. 407,582
Int. Cl.[5] B21F 9/02
U.S. Cl. 140—93.4 **13 Claims**



1. A tie application tool for applying a ball-lock tie having a strap and a locking head enclosing a ball means for locking the strap to the head, comprising:

tensioning means for withdrawing the strap of the tie from the head of the tie to tension the tie around an object; and

blade means for engaging the strap locking ball means of the tie and positioning the ball means in the head of the tie such that retrograde movement of the strap after the release of tension by the tool is prevented and substantially all of the tension applied to the tie is retained after release of the strap by the tool.

4,930,549

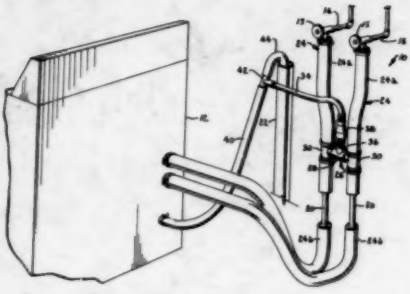
WASHING MACHINE HOSE PROTECTOR

Brian K. Renner, Rte. 1, Cleveland, Mo. 64734

Filed Mar. 10, 1989, Ser. No. 322,180

Int. Cl.[5] F16L *55/16*

U.S. Cl. 137—312 **12 Claims**



1. A device for protecting an appliance having at least two fluid inlet hoses that are connected at one end to a fluid source and at an opposite end to said appliance through use of nozzle fittings on both ends of said hose, and where said appliance is placed in proximity to a drainage site, said device comprising:

sleeves adapted to be fitted over said fluid inlet hoses;

means for interconnecting said sleeves; and

a drainage hose coupled to one of said sleeves and said interconnecting means and capable of being removably fitted into said drainage site so that excess fluid leaking from said inlet hoses may be transported to said drainage site.

4,930,550

GASEOUS FUELED TORCH APPARATUS AND FUELING MODULE THEREFOR

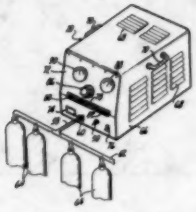
Kenneth S. Czerwinski, Detroit; Eugene Gabany, Taylor; Shanti S. Sharma, Bloomfield Hills, and John W. Turko, River Rouge, all of Mich., assignors to Fuel Concepts, Inc., Detroit, Mich.

Continuation of Ser. No. 797,438, Nov. 13, 1985, Pat. No. 4,776,366. This application Aug. 3, 1988, Ser. No. 227,631

The portion of the term of this patent subsequent to Oct. 11, 2005, has been disclaimed.

Int. Cl.[5] F16K *49/00*

U.S. Cl. 137—334 **11 Claims**



1. A fueling system for supplying natural gas to one of a natural gas fueled torch apparatus and at least one storage vessel, the torch apparatus including a torch adapted for use in cutting or welding operations, the torch apparatus further including a source of oxygen for supplying oxygen to the torch, and the torch being selectively operable for combustion of a mixture of natural gas and oxygen, said fueling system being connectable to an electric power source and supplying natural gas to one of the torch apparatus and the storage vessel at an elevated pressure from a relatively low pressure natural gas supply system, said fueling system comprising:

fueling system inlet means connectable in fluid communication with said natural gas supply system;

compression means in fluid communication with said fueling system inlet means and selectively energizable for compressing said natural gas from said natural gas supply system in order to increase its pressure, said compression means having a compression intake in fluid communication with said fueling system inlet means and a compression discharge outlet for discharging compressed natural gas from said compression means;

lubricant filter means in fluid communication with said compression discharge outlet for substantially trapping and collecting compression means lubricants from said compressed natural gas from said compression discharge outlet and for returning said collected compression means lubricants to said compression intake;

cooling means in fluid communication with said compression discharge outlet means for reducing the temperature of said compressed natural gas therefrom;

first fueling system discharge means selectively and releasably connectable to the torch apparatus for selectively supplying said compressed natural gas from said compression means to the torch apparatus, said first fueling system discharge means including adjustable regulator means in fluid communication with said compression discharge outlet and operable for preselectively adjusting the pressure of said compressed natural gas from said compression means in order to supply said compressed natural gas to the torch apparatus at a preselectively adjusted fueling module discharge pressure;

second fueling system discharge means in fluid communication with said compression discharge outlet selectively and releasably connectable to the storage vessel for selectively bypassing said adjustable regulator means and for selectively supplying said compressed natural gas from said compression means to the storage vessel without passing said compressed natural gas through said adjustable regulator means;

valving means for selectively discharging said compressed natural gas from said compression means through one of said first and second fueling module discharge means, said valving means including at least one electric solenoid-operated valve in each of said first and second fueling module discharge means, and a selector switch selectively energizable and operable for operating said solenoid valves to substantially simultaneously open either one of said solenoid-operated valves while closing the other of said solenoid-operated valves in order to selectively discharge said compressed natural gas through the corresponding one of said first and second fueling system discharge means;

preselectively adjustable cut-off means for automatically de-energizing said compression means when the natural gas from said compression discharge outlet reaches a preselected maximum compression discharge pressure; and

preselectively adjustable relief valve means for returning a portion of said natural gas from said first fueling system discharge means to said compression intake when the pressure of said natural gas in said first fueling system discharge means reaches a preselected relief pressure level, said preselectively adjusted fueling system discharge pressure being substantially limited to a pressure level no greater than said preselected relief pressure and no greater than said preselected maximum compression discharge pressure.

4,930,551

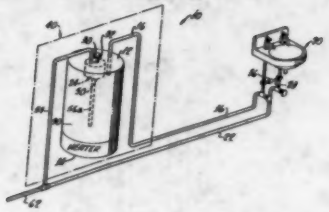
AUTOMATIC HOT WATER RECOVERY APPARATUS

Spencer K. Haws, Mesa, Wash., assignor to Alternative Energy Resources, Inc., Mesa, Wash.

Continuation-in-part of Ser. No. 297,306, Jan. 13, 1989, abandoned, which is a continuation of Ser. No. 150,072, Jan. 29, 1988, Pat. No. 4,798,224. This application Jun. 16, 1989, Ser. No. 367,206

Int. Cl.[5] F24H *1/00*

U.S. Cl. 137—337 2 Claims



1. A pressurized plumbing system comprising:

tank means for containing a volume of water under pressure greater than atmospheric pressure;

heating means for heating water contained inn said tank means:

a hot water line coupled to said tank means and extending to at least one plumbing fixture;

water inlet means having fitting means for coupling to a cold water supply line and a cold water line for introducing water to and withdrawing water from said tank means, said water inlet means including piston means for displacing water within said tank means to both enable hot water, heated in said tank means, to flow into the hot water line from the tank means and hat water, from the hot water line, to return into said tank means, said water inlet means further including means for exerting atmospheric pressure on a portion of the piston means:

a cold water line coupled to said tank means and extending to said plumbing fixture: and

conduit means, interconnected between the hot water and cold water lines, for enabling cold water to pass from the cold water line into the hot water line, said conduit means being distally disposed from said tank means, said conduit means including means for automatically adjusting the flow of water from the cold water line into the hot water line as a function of operating pressure within the plumbing system, said last mentioned means comprising,

a housing adapted for interconnection between the cold water supply line and the hot water supply line, said housing having means defining a fixed aperture therein for limiting the flow of water therethrough;

check valve means, disposed on one side of said fixed aperture, for preventing water flow from the hot water supply line to the cold water supply line; and

regulating disk means, disposed on another side of said fixed aperture for controlling the flow of cold water into the hot water line as a function of operating pressure within the plumbing system, said regulating disk means comprising an elastic member having an outside diameter greater than the fixed aperture, means defining a hole therethrough generally aligned with the fixed aperture and means defining a concave surface extending from the outside diameter to the regulating disk means hole, said regulating disk means being disposed in said housing with said concave surface facing said fixed aperture on a hot water side of the regulating disk means, said regulating disk means having sufficient elasticity to enable the operating pressure to flatten the concave surface and reduce the diameter of the hole through the regulating disk means thereby controlling the flow of cold water therethrough.

4,930,552

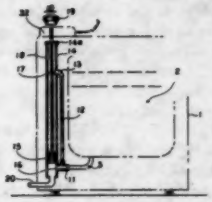
DRAIN STANDPIPE

William E. Estep, P.O. Box 314, Powellton, W. Va. 25161

Continuation-in-part of Ser. No. 346,626, May 2, 1989. This application Oct. 13, 1989, Ser. No. 420,871

Int. Cl.[5] D06F *39/08*

U.S. Cl. 137—362 8 Claims



1. A drain standpipe for use with a washing machine, comprising:

a vertically standing elongated hollow outer tube having bottom and opposite ends;

a concentric hollow inner tube slidably mounted inside said outer tube, said inner tube outside surface and said outer tube inside surface forming a close seal;

means to slide said inner tube relative to said outer tube;

two apertures on said outer tube, one of said apertures disposed adjacent a bottom end of said outer tube and the other aperture disposed toward the opposite end of said outer tube, said inner tube normally disposed over said one aperture in order to seal it, but capable of being slid along said outer tube to uncover said one aperture;

a hollow elongated water level pipe, having bottom and opposite ends, mounted exteriorly to said outer tube, each open end of said water level pipe mounted over one of said apertures on said outer tube such that said water level pipe can feed into the interior of said outer pipe.

4,930,553

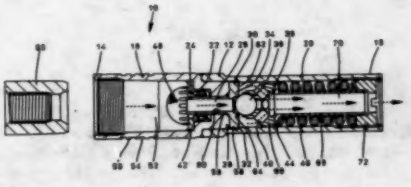
PRESSURE RELIEF VALVE

John L. Grillo, East Haddam, Conn., assignor to The Lee Company, Westbrook, Conn.

Filed Jan. 23, 1989, Ser. No. 299,305

Int. Cl.[5] F16K *15/04*

U.S. Cl. 137—508 19 Claims



1. A pressure relief valve comprising:

(a) housing means for forming a generally tubular, axially extending body defining an axially extending cavity with opposing valve seat stopping means projecting interiorly from the inside wall of said body;

(b) valve seat means slidingly and axially rotatably received within said body, said valve seat means forming an axially extending central flow passage and having an upstream

end and a downstream end, the downstream end forming an annular valve seat edge surrounding said passage and a radially projecting shoulder, said shoulder alternately engaging said valve seat stopping means, the valve seat means being formed such that the radius of the outside perimeter of the upstream end of said valve seat means exceeds the radius of the annular valve seat edge by an amount sufficient that when the valve is closed the force exerted on the valve seat means in a downstream direction by the pressure of the fluid media exceeds the force of friction between the body and the valve seat means;

(c) poppet means slidingly and axially rotatably received within said body and axially displacable therein, the poppet means having a valve surface sealingly engageable with the valve seat means to prevent the flow of fluid through the valve seat means and axially displaceable from the valve seat means to permit the flow of fluid between the valve surface and the valve seat means and having a generally sleeve-like portion and a plurality of passages to provide fluid communication with the interior of said sleeve-like portion; and

(d) biasing means for biasing said poppet means against said valve seat means in an upstream direction so that unless and until the force exerted against said poppet in a downstream direction exceeds a predetermined threshold, said valve surface sealingly engages said valve seat means, and when the force exerted against said poppet in a downstream direction exceeds the predetermined threshold, said poppet is axially displaced from the valve seat means in the downstream direction.

4,930,554

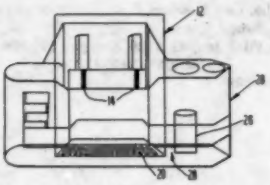
SANITARY COVER FOR A LIQUID DISPENSER

Kenneth A. Alley, Rd. #4, Box 4820, Berwick, Pa. 18603

Filed Apr. 20, 1988, Ser. No. 183,786

Int. Cl.[5] B65B *3/04*

U.S. Cl. 141—97 **14 Claims**



1. A cover for a enclosing a dispensing area of a liquid dispenser for dispensing liquid into a cup, comprising:

(a) a casing means adapted for enclosing the dispensing area of a liquid dispenser wherein said enclosed dispensing area includes a region adapted for disposing said cup during filling of said cup;

(b) a hand opening through said casing means adapted to be sufficiently large in the dispensing area to pass a hand therethrough and sufficiently small to prevent passage of said cup therethrough extending laterally across said casing means from a first side to a second side; and

(c) a cup receiving means oriented adjacent said hand opening at said first side and cup outlet means oriented at said second side of said hand opening.

4,930,555

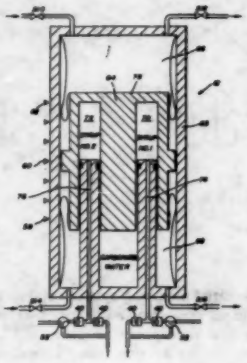
MICROGRAVITY DISPENSER WITH AGITATOR, METERING DEVICE AND CUP FILLER

Arthur G. Rudick, Marietta, Ga., assignor to The Coca-Cola Company, Atlanta, Ga.

Division of Ser. No. 116,236, Nov. 3, 1987, Pat. No. 4,846,234. This application Mar. 23, 1989, Ser. No. 327,534

Int. Cl.[5] B65B *3/04*

U.S. Cl. 141—98 **1 Claim**



1. A metering device for a microgravity dispenser system comprising:

a main piston cylinder housing;

a main piston cylinder provided within said main piston cylinder housing;

at least two channels axially formed within said main piston cylinder housing, said main cylinder being reciprocally engagable with said at least two channels to force predetermined quantities of sYrup therethrough;

carbonated water inlet means, formed in a first end of said cylinder housing, for forcing carbonated water into said main cylinder housing;

carbonated water outlet means, formed adjacent said carbonated water inlet means, for expelling carbonated water to the exterior of said main piston cylinder housing;

means for circulating syrup from at least two syrup supply tanks to corresponding ones of said at least two channels, whereby a predetermined quantity of a selected syrup is metered with a predetermined quantity of carbonated water within said dispenser system;

means, formed in a second end of said main cylinder housing, for applying an axial pressure to an upper surface of said main piston cylinder, said axial pressure acting to keep carbon dioxide dissolved in said carbonated water in solution during discharge of said carbonated water to the exterior of said main piston cylinder housing; and

means for releasing said axial pressure from the upper surface of said main piston cylinder, whereby said release of pressure enables syrup and carbonated water to enter said main piston cylinder housing.

4,930,556

LAY-UP FOR LAMINATED-VENEER-LUMBER

Peter J. Priboda, Burnaby, Canada, assignor to Compax Engineering & Development Ltd., Burnaby, Canada

Filed Jun. 3, 1988, Ser. No. 202,791

Int. Cl.[5] B27D *1/10*; **B27L** *5/02*

U.S. Cl. 144—347 **8 Claims**

5. A method of forming a laminated-veneer-lumber comprising:

(a) rotary-peeling a plurality of veneer sheets from a plurality of logs which have their ends cut at an oblique angle to

the square cut of the logs to thereby form sheets with opposing sinusoidal bevelled edges;

(b) stacking the plurality of veneer sheets so that the opposing sinusoidal bevelled edges of the veneer sheets in each layer of the stack are not aligned with one another; and

(c) laminating the plurality of veneer sheets together utilizing a suitable adhesive.

7. A method of forming a butt joint lay-up, comprising:

(a) slitting veneer sheets into two respective halves through

the interiors of the sheets to form interior slit edges, which sheets before splitting have at least the opposite exterior edges thereof cut according to a wave form common to all unslit sheets used in the same layup and originating at the same location relative to one edge of the veneer sheet;

(b) interchanging the two halves of each slit veneer sheet such that the original exterior wave form edges become abutting interior wave form edges; and

(c) forming a lay-up by butt joining together the abutting interior wave form edges of the veneer sheets.

4,930,557

COVERING FOR LARGE, HEAVY OBJECTS IN PARTICULAR MILITARY EQUIPMENT

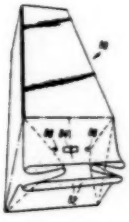
Jürgen Lohse, Norderstedter Strasse 88A, D-2359 Henstedt-Ulzburg, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 752,181, Jul. 2, 1985, abandoned. This application Oct. 21, 1987, Ser. No. 110,786

Claims priority, application Fed. Rep. of Germany, Dec. 3, 1983, 3343813

Int. Cl.[5] B65D *75/04, 75/28, 85/68*

U.S. Cl. 150—166 **15 Claims**



1. A covering for long-term storage of heavy objects such as military equipment, armored cars, vehicles and the like, comprising:

a tube of water-repellent material, said tube having ends defined by said material, said material being continuous between said ends of said tube and having folds at each said end, said material contacting itself at each said end to define a seam at each said end; and

at least one removable elongate clamp engaging material on both sides of each said seam along a line at each open end of said tube to hold closed said ends of said tube,

wherein the material at each end of the tube defines at the seam a continuous edge having a length, and said at least one clamp has a length, the total clamp length at each end being less than one-half the length of the continuous edge at the seam.

4,930,558

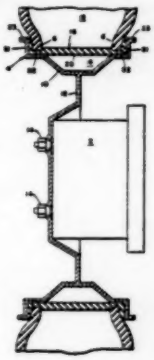
INSERT FOR PNEUMATIC WHEEL

Edward H. Sahagian, 67 Chester St., Arlington, Mass. 02174

Filed Mar. 8, 1989, Ser. No. 320,563

Int. Cl.[5] B60C *5/22*

U.S. Cl. 152—339.1 **9 Claims**



1. A resilient wheel having:

a circular hub;

an annular tire rim of substantially U-shaped cross section secured to the circumference of the hub and opening away from the hub;

a one-piece, annular elastomeric member sealed against the outer portion of the rim on the side of the rim away from the hub forming a first sealed airtight space defined by the inner annular surface of the elastomeric member and the interior surface of the U-shaped portion of the rim;

a tire mounted on the rim forming a second sealed airtight space defined by the outer annular surface of the elastomeric member and the inner surface of the tire;

the elastomeric member having two continuous radially extending portions, each being located at an equal distance in an axial direction inwardly from one side of the rim, the distance being such that each bead of a tire mounted on the rim resides between a radial radially extending portion of one side of the rim and one of the extending portions of the elastomeric member and is subsequently held in place; and

the elastomeric member being sufficiently resilient to allow transient pressure changes in the second sealed airtight space caused by external tire impact to be transmitted to and absorbed by the first sealed airtight space.

4,930,559

PNEUMATIC TIRE

Kenji Takehara, Kobe, and Yoshiyuki Takada, Shirakawa, both of Japan, assignors to Sumitomo Rubber Industries, Ltd., Hyogo, Japan

Filed Jun. 29, 1988, Ser. No. 213,304

Claims priority, application Japan, Jul. 1, 1987, 62-166071; Jun. 7, 1988, 63-140704

Int. Cl.[5] B60C *9/20*

U.S. Cl. 152—531 **7 Claims**

1. A pneumatic tire having improved steering stability and high speed durability consisting essentially of:

a pair of bead cores,

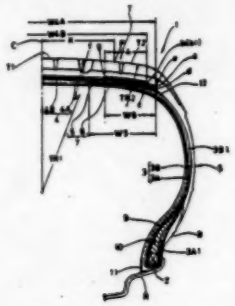
a carcass turned up at both of its ends and extending around and secured to said bead cores,

a tread disposed on said carcass and having a tread surface comprising an axially inner arc portion with a radius of curvature TR1 and two axially outer arc portions with a radius of curvature TR2,

a belt comprising at least two plies of steel cords disposed radially outside said carcass, and

a pair of axially, spaced-apart inner bands disposed between said carcass and said belt, each of said bands having stretchable organic fiber cords laid substantially parallel to the tire equator, wherein

the axially outer edge of said inner bands and the edges of



the widest ply of said belt are substantially aligned so that the outer edge of each inner band coincides with the edge of the widest belt ply or wherein the outer edge of each inner band projects outwardly not more than 8 mm from the outer edge of the widest belt ply,

the ratio TR2/TR1 of said radius TR2 to the radius TR1 is in a range of 0.15 to 0.45 when the tire is mounted on a standard rim and inflated to 5% of the standard pressure, and

each border P between said inner arc portion and said outer arc portions is located in a region extending axially outward from the axially inner edge of each inner band to the axially outer edge of an overlapping region where said at least two plies of said belt are overlapped.

4,930,560

RADIAL TIRE FOR MOTOR VEHICLES

Franco Lesti, Rome, Italy, and Jean M. Carpentier, Labuissiere, France, assignors to Bridgestone/Firestone, Inc., Akron, Ohio

Filed Apr. 17, 1989, Ser. No. 339,543

Claims priority, application Italy, Apr. 27, 1988, 67385 A/88

Int. Cl.[5] B60C *15/06*

U.S. Cl. 152—554 **2 Claims**

1. A radial tire for motor vehicles, said tire comprising two metal beads; a body ply comprising two lateral portions, each turned about a respective metal bead and joined by an end portion to the outer surface of a main portion of the body ply over a respective bead; and an innerliner and outer abrasion strip integral with each other, and turned about each lateral portion of said body ply; characterized by the fact that each lateral portion of said body ply is turned substantially 360° about a respective metal bead; said end portion of each lateral portion of said body ply joining with the main portion of said body ply immediately over the respective bead; said abrasion strip presenting a section varying in thickness, with a portion of said abrasion strip being located substantially radially outwards of the respective bead and in contact with the respective end portion of said body ply, with no bead filler being provided.

4,930,561

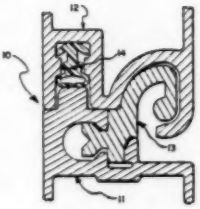
ROLL-UP DOOR JOINT CONSTRUCTION

Roy T. Clay, Snyder, N.Y., assignor to Whiting Roll-up Door Mfg. Corp., Akron, N.Y.

Filed Feb. 28, 1989, Ser. No. 316,489

Int. Cl.[5] E06B *3/12*

U.S. Cl. 160—229.1 **19 Claims**



1. In an elongated first panel section for an upwardly-acting door, said first panel section having spaced parallel planar inner and outer surfaces, the improvement which comprises:

one longitudinal marginal end portion of said first panel section having a generally-stepped configuration including a first surface extending away from one of said planar surfaces, having an intermediate second surface extending away from said first surface, and having a third surface extending away from said second surface to join the other of said planar surfaces;

a recess extending into said first panel section from said second surface, said recess including an enlarged cavity portion within said first panel section and a narrowed entrance portion extending into said first panel section from said second surface and communicating with said enlarged cavity portion; and

a post member extending away from said third surface in spaced relation to said second surface, said post member being connected to said third surface by a flexible web portion, said post member being initially formed to lie at one angle with respect to said third surface and being bent through compliant plastic deformation of said web portion so as to be arranged at another angle with respect to said third surface.

4,930,562

DECORATIVELY COVERED BLIND STRUCTURE

Barry I. Goodman, Miami, Fla., assignor to Hunter Douglas Inc., Upper Saddle River, N.J.

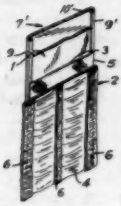
Filed Mar. 10, 1989, Ser. No. 321,705

Int. Cl.[5] E06B *9/36*

U.S. Cl. 160—236 **16 Claims**

1. A decorative member in combination with an elongated support member having a support surface and turned over side edges defining spaced facing grooves of predetermined depth along said edges, said decorative member comprising:

(a) an elongated substrate having a self sustaining shape, front face and side edges defining a width about equal to the spacing between said facing grooves, said substrate being positionable on the support surface of the support member with the side edges held in said grooves and the front face exposed between the grooves along a central area of the face intermediate the side edges of the substrate; and



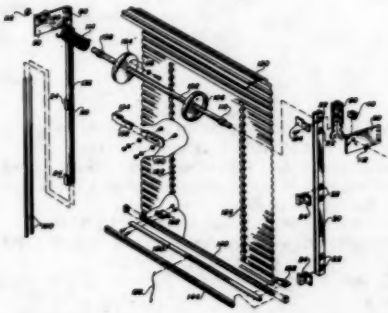
(b) a cover member attached to said substrate along said central area and free from said substrate along its side edges, said cover member having a width greater than the width of said substrate and extending outwardly beyond the side edges thereof for covering the turned over side edges of the support member when the decorative member is positioned thereon.

4,930,563

MODULAR SECURITY DOOR SYSTEM

Harry E. Finch, 5273 Vista del Sol, Cypress, Calif. 90630, and Geza J. Szayer, 24771 Acropolis Dr., Mission Viejo, Calif. 92691

Filed Sep. 22, 1987, Ser. No. 100,340
Int. Cl.[5] E06B *9/17*
U.S. Cl. 160—271 **18 Claims**



1. A security door system for mounting in a door opening, comprising:

a pair of identical guide tracks for vertical installation as door guide members on both sides of a door, each of said identical guide tracks being universally mountable to encompass either side edge of said door opening;

a pair of identical plate support brackets for installation onto the top of said guide tracks, each of said plate support brackets being universally mountable onto a guide track on either side of the door opening, said plate support brackets extending above the top edge of the door opening;

a pair of identical support plates for installation onto said plate support brackets to be supported thereby, each of said support plates being universally mountable onto a plate support bracket on either side of the door opening, said support plates extending inwardly from the top of the door opening;

a barrel assembly horizontally, rotatably mounted on said support plates; and

a roll-up door mounted at the top thereof to and supported by said barrel assembly, said roll-up door being positionable to cover said door opening with the side edges of said roll-up door being retained by said guide tracks, said roll-up door being rolled about said barrel assembly as the door is raised, wherein each of said support plates has a circular aperture therein at the end of said support plates away from said plate support brackets, and said system additionally comprises:

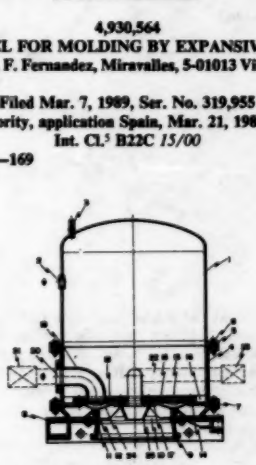
a pair of U-shaped axle support brackets each having a notch therein which notch extends throughout the curved section of said U-shaped support bracket and up much of the length of the legs of said U-shaped support bracket, said notch in one of said U-shaped support brackets fitting over the top edge of each said support plate, said curved section of said U-shaped support brackets being concentric with and slightly smaller in diameter than said circular aperture in each of said support plates, said support plates each having means therein for retaining one of said U-shaped support brackets in position thereon.

4,930,564

AIRVESSEL FOR MOLDING BY EXPANSIVE WAVES

Vicente L. D. F. Fernandez, Miravalles, 5-01013 Vitoria (Alava), Spain

Filed Mar. 7, 1989, Ser. No. 319,955
Claims priority, application Spain, Mar. 21, 1988, 8800859
Int. Cl.[5] B22C *15/00*
U.S. Cl. 164—169 **3 Claims**



1. In an airvessel for molding articles by expansive waves, comprising a tank for accumulating air until a working pressure of the vessel is reached; a base connected to said tank; a diffuser connected to said base and through which air must be suddenly released on a mold; and a valve for controlling said release, said valve being arranged within a framework itself and in positional correspondence with said diffuser, the improvement comprising said valve including a highly elastic membrane; two annular concentrical flanges; a support plate for supporting said membrane and said flanges in said tank, said membrane being connected to said support by said flanges and fastening means so that a central part of said membrane is immovable and an annular tightly sealed chamber is formed between said membrane and said support plate; a conduit for supplying pressurized air and opening into said chamber, said base having a neck portion upwardly projecting therefrom and having an upper edge defining an annular seat facing said membrane, said neck portion enclosing an opening connecting said tank with said diffuser whereby when said membrane is inactive an annular pitch is established between said membrane and said seat whereas, when pressure is applied to said chamber by said air, said membrane is deformed and closes tightly

against said seat and then opens as soon as pressure supplied to said chamber is ceased; said membrane, said support plate and an internal flange of said two concentrical flanges having at a central part thereof an opening which extends axially into said tank and opens into an escape conduit at a substantial distance from said diffuser so that residual air present in said diffuser is released to an exterior of said tank at a location which is sufficiently remote from the mold.

4,930,565

MELT OVERFLOW SYSTEM FOR PRODUCING FILAMENTARY AND FILM PRODUCTS DIRECTLY FROM MOLTEN MATERIALS

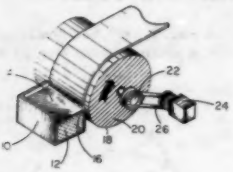
Lloyd E. Hackman, Worthington, Ohio; James Dickson, Stirling, N.J.; David L. Dunlap, Gahanna, Ohio, and Mark E. Handshey, Columbus, Ohio, assignors to Ribbon Technology Corporation, Gahanna, Ohio

Continuation of Ser. No. 89,544, Aug. 26, 1987, Pat. No. 4,813,472, which is a continuation-in-part of Ser. No. 819,474, Jan. 16, 1986, abandoned, which is a continuation of Ser. No. 561,309, Dec. 14, 1983, abandoned. This application Nov. 30, 1988, Ser. No. 278,016

The portion of the term of this patent subsequent to Mar. 21, 2006, has been disclaimed.

Int. Cl.[5] B22D *11/06*

U.S. Cl. 164—463 **9 Claims**



1. An improved method for producing ribbon, or film from a molten material held in a receptacle, said method being the type wherein a layer of the molten material is solidified on a heat extracting substrate by moving a surface of the substrate past a region of contact with the molten material, cooling the molten material and removing it from the substrate, wherein the improvement comprises:

(a) forming adjacent ridges surrounding the outer surface of a symmetrical, heat extracting substrate;

(b) forming an opening through a side wall of the receptacle, the opening extending from above the level of the free surface of the molten material in the receptacle downwardly to a lower edge at the bottom of the opening;

(c) positioning the heat extracting substrate laterally disposed of the receptacle and adjacent the edge;

(d) raising the level of the free surface of the molten material in the receptacle above the edge of said opening to cause the molten material to overflow over said edge and against the substrate to form a melt front at the interface of the molten material and the substrate, the level of the free surface being maintained sufficiently above the edge that the melt front interfacing against the substrate extends downwardly from the free surface of the molten material farther than the root depth of the ridges on the substrate and sufficiently far that the molten material cannot form and hold a meniscus by surface tension between the edge and the level of the free surface, but instead is confined by the substrate; and

(e) rotating the substrate to move the substrate surface past the melt front to form a sheet of material extending across the tips of several ridges.

4. An apparatus for producing ribbon or film from a molten material, the apparatus comprising:

(a) a receptacle for containing a pool of molten material at a selected horizontal level for the free surface of the pool, the receptacle having an opening extending from above the free surface level to a bottom edge of the opening, the bottom edge being sufficiently below the free surface level that the molten material can not form and hold a meniscus by surface tension between the edge and the level of the free surface;

(b) a heat extracting substrate laterally disposed with respect to the receptacle, the substrate having adjacent ridges formed about a generally horizontal axis on the outer surface of a symmetrical, heat extracting substrate and positioned adjacent the edge and the opening for confining the molten material and preventing it from overflowing downwardly out of the receptacle, the positioning of the substrate relative to the edge further being sufficiently low to make ribbon or sheet and not fiber and filaments; and

(c) drive means drivingly connected to the substrate for continuously moving the surface of the substrate upwardly past the edge and past a melt front formed at the interface of the molten material and the substrate surface at a speed of rotation which is sufficiently slow to make ribbon or sheet extending across several ridges and not fiber or filaments.

4,930,566

METHOD FOR CONTINUOUS CASTING OF AN ALUMINUM-LITHIUM ALLOY

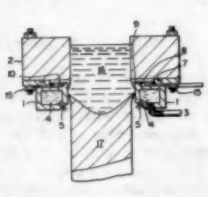
Shigeru Yanagimoto, Fukushima, and Ryoichi Kondo, Kanagawa, both of Japan, assignors to Showa Denko Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 22, 1989, Ser. No. 411,126

Claims priority, application Japan, Sep. 24, 1988, 63-239541

Int. Cl.[5] B22D *11/12, 11/16*

U.S. Cl. 164—475 **7 Claims**



1. A method for continuous casting of an aluminum-lithium alloy through an open-ended mold for forming an ingot, comprising, contacting a pressurized gas with a molten surface part directly before solidication, characterized in that said pressurized gas consists of from 1 to 15 volume % of oxygen and balance of inert gas.

4,930,567

DAMPER MOTOR CONTROL CIRCUIT FOR AN AUTOMOTIVE AIR CONDITIONING SYSTEM

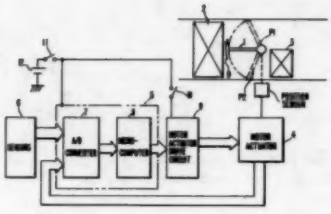
Hidemitsu Akabane, Takasaki; Toshimi Isobe, Isesaki, and Seiichi Hoshino, Nitta, all of Japan, assignors to Sanden Corporation, Gunma, Japan

Filed Jul. 20, 1988, Ser. No. 221,879

Claims priority, application Japan, Jul. 20, 1987, 62-110013[U]

Int. Cl.[5] F25B 29/00; G05B 1/06

U.S. Cl. 165—25 4 Claims



1. An automotive air conditioning control system comprising:

(a) an air mix damper capable of positional movement for regulating the temperature of air to a passenger compartment and having means for providing damper position signals;

(b) a first control circuit for outputting signals for controlling the position of the air mix damper, the first control circuit being responsive to a plurality of variable conditions including at least damper position, indicated by said means for providing damper position signals, an inside air temperature and an outside air temperature,

the first control circuit comprising:

a plurality of sensors for sensing at least the inside and outside air temperature conditions,

an analog to digital converter for converting the outputs of the plurality of sensors and the damper position signals to digital signals, and

a processor for receiving the digital signals output of the analog to digital converter and having means for outputting signals to control movement of the air mix damper to a desired position;

(c) a switch for commanding a maximum air condition; and

(d) a second control circuit, responsive to said switch, having means for controlling movement of the air mix damper to a maximum position when said switch commands said maximum air condition, the second control circuit comprising:

a logic circuit having first and second inputs and first and second outputs, signals at the first and second inputs determining a forward operating movement of the air mix damper, a reverse operating movement of the air mix damper or no movement, the logic circuit being normally responsive to the means for outputting signals of the first control circuit and

a signal override circuit, responsive to the switch and coupled between the first control circuit and the logic circuit, the signal override circuit having means for inputting a no movement signal to the logic circuit to disable movement of the air mix damper after a maximum predetermined time period from when said switch commands said maximum condition has elapsed and while said switch continues to command said maximum condition regardless of the operation of the means for outputting signals of the first control circuit.

4,930,568

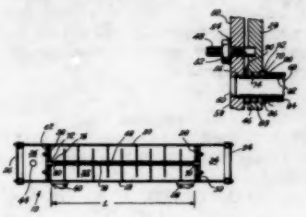
HEAT EXCHANGER

Robert J. Janezich; Charles E. Cedar, both of Hibbing, and Todd G. Dosen, Side Lake, all of Minn., assignors to L and M Radiator, Inc., Hibbing, Minn.

Filed May 17, 1989, Ser. No. 352,961

Int. Cl.[5] F28F 9/02

U.S. Cl. 165—76 6 Claims



1. A heat exchanger comprising, in combination:

a housing including an inlet port and an outlet port;

a first header plate secured within said housing and defining a series of first openings therein, each of said first openings having a predetermined diameter;

a second header plate secured within said housing and defining a series of second openings therein;

said first and second header plates cooperating to define a heat transfer chamber, an inlet chamber and an outlet chamber within said housing, said inlet and outlet ports communicating within said heat transfer chamber;

a series of substantially cylindrical heat transfer tubes spanning said heat transfer chamber and communicating with said inlet and outlet chambers, said heat transfer tubes having a maximum outer diameter less than said predetermined diameter so as to permit passage of said heat transfer tube through said first openings of said first header plate, each of said heat transfer tubes including a first end portion, a central finned portion, a second end portion elongated with respect to said first end portion, and a shoulder interposed said central finned portion and said second end portion;

a series of first seals positioned within said first openings, each of said first seals slideably receiving said first end portion of each of said heat transfer tubes and providing a substantially leakproof seal between said first header plate and said first end portion; and

a series of second seals positioned within said second openings, each of said second seals slideably receiving said second end portion of each of said heat transfer tubes and providing a substantially leakproof seal between said second header plate and said second end portion;

said first end portion of each of said heat transfer tubes disengaging said first header plate whenever said shoulder thereof is substantially adjacent said second header plate.

6. A method for manufacturing and maintaining a heat exchanger including inlet and outlet chambers, a heat transfer chamber having a predetermined chamber length, first and second header plates having first and second openings therein, respectively, first and second seals, and a series of heat transfer tubes having a first end portion and a central finned portion, comprising:

providing each of said heat transfer tubes with a second end portion, elongated with respect to said first end, and a shoulder interposed said central finned portion and second end portion such that said first end portion and said central finned portion define a tube length less than said predetermined chamber length;

positioning one of second seals in one of said second openings;

sliding one of said heat transfer tubes through a correspond-

ing one of said first openings and engaging said second end portion thereof with said second seal;

forcing said second end portion through said second seal until said shoulder is substantially adjacent said second header plate, thereby disengaging said first end portion from said first header plate;

positioning one of said first seals in said corresponding one of said first openings;

engaging said first end portion of said heat transfer tube with said first seal; and

forcing said first end portion through said first seal until said first and second end portions communicate with said inlet and outlet chambers.

4,930,569

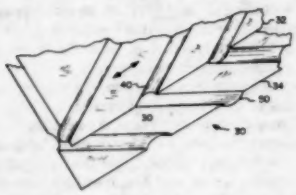
HEAT TRANSFER ELEMENT ASSEMBLY

William F. Harder, Wellsville, N.Y., assignor to The Air Preheater Company, Inc., Wellsville, N.Y.

Filed Oct. 25, 1989, Ser. No. 426,363

Int. Cl.[5] F28D *19/00*

U.S. Cl. 165—10 **5 Claims**



1. An assembly of heat transfer element plates for a regenerative heat exchanger comprising: a plurality of first profiled heat transfer plates and a plurality of second profiled heat transfer plates, said first and second heat transfer plates stacked alternately in juxtaposed relationship so as to form a plurality of flow channels extending through said assembly between two opposite end surfaces of the stacked heat transfer plates, each of said first and second profiled heat transfer plates being provided with a plurality of first single-lobed notches protruding outwardly in one direction at spaced intervals across the width thereof and extending obliquely along the length thereof, and further being provided with a plurality of second single-lobed notches extending parallel to said plurality of first single-lobed notches and protruding outwardly in the opposite direction with at least one of said second single-lobed notches positioned intermediate each pair of said first single-lobed notches, said first and second plates being disposed within said assembly relative to each other with the first and second notches of said first plates extending transverse to the first and second notches of said second plates whereby the notches of adjacent plates cross each other at the points of contact therebetween.

4,930,570

ELECTRONIC EQUIPMENT COOLING DEVICE

Kenji Okuyasu, 20-15, Mukai-machi, Gyoda-shi, Saitama-ken, 361, Japan

Filed Dec. 22, 1988, Ser. No. 288,764

Claims priority, application Japan, Dec. 22, 1987, 62-324820

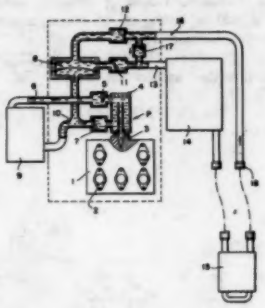
Int. Cl.[5] F28D *15/02*

U.S. Cl. 165—104.14 **1 Claim**

1. An electronic equipment cooling device comprising:

a first cyclic flow passage which includes equipment to be cooled, a radiator or a cooling exchanger, and two stopper valves for making the direction of flow one way; and

a second cyclic flow passage which includes a heat drive pump driven by heat from heating devices in the equipment and a radiator or a cooling exchanger for cooling said heat drive pump,



said two cyclic flow passages being connected to each other with a pressure conducting device.

4,930,571

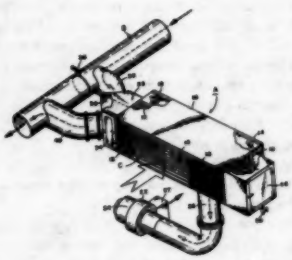
HEAT RECOVERY APPARATUS

James B. Paull, Andover, Mass., assignor to Industrial Energy Corporation, Andover, Mass.

Continuation-in-part of Ser. No. 731,525, May 8, 1985, abandoned. This application Sep. 29, 1986, Ser. No. 912,992

Int. Cl.[5] F28F *17/00, 19/00*

U.S. Cl. 165—111 **3 Claims**



1. A heat recovery system for cleaning and cooling an exhaust stream of hot air contaminated with vaporized, condensible liquids and finely divided particulate solids emanating from a heating operation and flowing through a lateral elongate duct which comprises:

a. an elongate frame mounted laterally and transversely of said elongate duct;

b. first indirect heat exchange means comprising first lateral heat exchange tubes carried by said frame and interconnected with said duct for inducting lateral flow of said exhaust hot air stream through said first tubes;

c. second indirect heat exchange means carried by said frame comprising second lateral heat exchange tubes mounted in parallelism with said first tubes and interconnected with said duct for laterally returning said inducted hot air stream to said duct;

d. chambered solids collecting means laterally interconnected with said first and second tubes for laterally receiving said hot air stream from said first tubes, laterally reversing the direction of flow of said hot air stream and laterally delivering said hot air stream to said second tubes, and for laterally centrifugally separating finely divided solids in said hot air stream therefrom;

e. air fan means for laterally cross-flowing fresh air through

said frame and across the outsides of said first and second heat exchange means at a predetermined flow set to partially cool said hot air stream flowing through said first tubes to a temperature not lower than a temperature within 5° F. above the dew point of said vaporized liquids in said hot air stream and for partially heating said fresh stream of air and for further cooling said hot air stream in said second tubes to a temperature below the dew point of said vaporized liquids to thereby liquefy a significant portion thereof and for further heating said fresh stream of air; and

f. means for delivering said thus-heated fresh air to a desired heating operation.

4,930,572

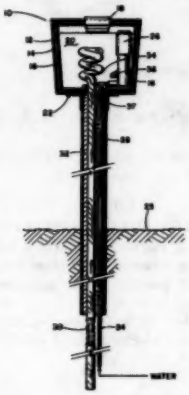
HEAT PIPE AND AQUA-THAW ANIMAL WATERER

John R. Doshier, 232 Montclair, Tulsa, Okla. 74104

Filed Sep. 14, 1988, Ser. No. 244,716

Int. Cl.[5] F28D *15/02;* **A01K** *7/00*

U.S. Cl. 165—45 **8 Claims**



1. An animal watering device comprising:

an insulated reservoir capable of retaining a selected volume of water;

a heat tube comprising a length of tubing having an upper and a lower sealed end wherein the upper end extends into the reservoir for direct contact with the water present in the reservoir and wherein the lower end extends into and contacts the earth below the frost line;

a volatile working fluid contained in said heat tube, the working fluid comprising a material capable of being vaporized by the heat of the earth beneath the frost line and capable of being condensed in the upper end of the heat tube and wherein the portion of said heat tube adjacent said upper end is folded in overlapping relationship within said reservoir for improved transfer of heat from said tube to the water in said reservoir.

4,930,573

DUAL HYDRAULIC SET PACKER

Andrew R. Lane, Plano, and Richard M. Sproul, Grapevine, both of Tex., assignors to Otis Engineering Corporation, Carrollton, Tex.

Filed Apr. 6, 1989, Ser. No. 334,720

Int. Cl.[5] E21B *23/06, 33/122*

U.S. Cl. 166—120 **13 Claims**

1. A hydraulic well packer comprising, in combination:

a tubular body mandrel having a longitudinal flow passage;

a seal element assembly movably mounted on said tubular body mandrel;

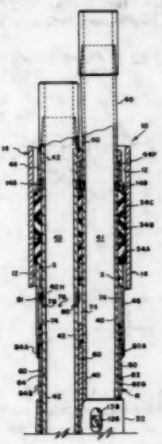
an anchor slip assembly supported by said tubular body mandrel;

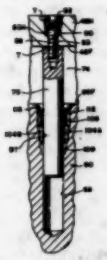
a hydraulic actuator assembly movably mounted onto said tubular body mandrel, said hydraulic actuator assembly including first and second movable force transmitting means engagable with said seal element assembly and said anchor slip assembly, respectively;

said first movable force transmitting means having an axial slip pocket;

a locking rod slideably received within said slip pocket, said locking rod being connected to said second movable force transmitting means;

a ratchet slip assembly received within said slip pocket and engaging said locking rod, said ratchet slip assembly having teeth engaging the external surface of said locking rod and disposed relative to said locking rod for permitting extension of said locking rod out of said slip pocket, while preventing retraction of said locking rod into said slip pocket; and,





wherein said first movable force transmitting means comprises a piston and wherein said second movable force transmitting means comprises a setting cylinder, said piston being slideably received in sealing engagement against the inside diameter bore of said setting cylinder, the head of said piston defining a first axial boundary of a variable volume pressure chamber, and said piston having a spreader cone for engaging said slip anchor assembly, said setting cylinder having a head portion disposed for engagement against said seal element assembly, and the inside face of said setting cylinder head defining a second

axial boundary of the variable volume pressure chamber, said locking rod extending axially through said variable volume pressure chamber.

4,930,574

METHOD FOR TERTIARY OIL RECOVERY FROM DEEP-WELL DRILL HOLES WITH UTILIZATION OF THE ESCAPING PETROLEUM GAS

Walter Jäger, Engelskirchen, and Dietmar Schreiber, Bergisch Gladbach, both of Fed. Rep. of Germany, assignors to Interatom GmbH, Bergisch Gladbach, Fed. Rep. of Germany

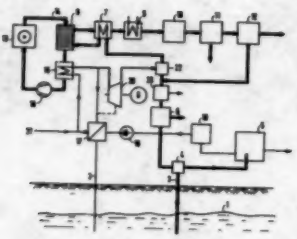
PCT No. PCT/DE87/00086, § 371 Date Sep. 19, 1988, § 102(e) Date Sep. 19, 1988, PCT Pub. No. WO87/05658, PCT Pub. Date Sep. 24, 1987

PCT Filed Mar. 2, 1987, Ser. No. 273,817

Claims priority, application Fed. Rep. of Germany, Mar. 19, 1986, 3609253

Int. Cl.[5] E21B *43/24, 43/40*; C01B *3/34*

U.S. Cl. 166—266 **10 Claims**



1. A method for tertiary oil recovery and gas utilization by the introduction of nuclearly-heated steam into an oil field and the removal, separation and preparation of an escaping oil-gas-water mixture, which comprises heating a steam reformer and producing steam in a steam generator with heat from a helium-cooled high-temperature reactor, partly feeding the steam produced in the steam generator through a pipe into an oil field, separating methane and other compo-nents from the escaping oil-gas-water mixture, preheating the methane in a preheater, and subsequently partly feeding the steam produced in the steam generator and the methane to the steam reformer for separating methane into hydrogen and carbon monoxide.

4,930,575

METHOD OF PROTECTING A PERMEABLE FORMATION

David O. Falk, Denver, Colo., assignor to Marathon Oil Company, Findlay, Ohio

Filed Mar. 31, 1989, Ser. No. 331,934

Int. Cl.[5] E21B *7/00, 33/138, 33/14*

U.S. Cl. 166—295 **19 Claims**

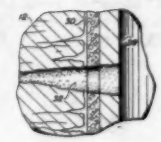
8. A method of drilling a well bore through subsurface formations including a permeable formation, comprising the steps of:

drilling a well bore through the permeable formation to at least the lower boundary thereof;

filling the bore in the permeable formation with liquid composition capable of gelling, the liquid composition containing a gel breaker;

allowing the gel to mature;

drilling through the gel so as to open the well bore in the permeable formation, some of the gel remaining to plug the permeable formation in the well bore;



installing a casing in the well bore in the permeable formation; and

allowing the remaining gel to revert to a liquid.

4,930,576

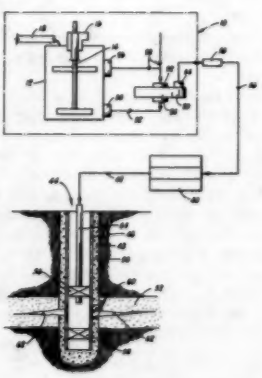
SLURRY MIXING APPARATUS

Leslie N. Berryman; Herbert J. Horinek; Max L. Phillippi; David A. Prucha; Vincent G. Reidenbach, and Stanley V. Stephenson, all of Duncan, Okla., assignors to Halliburton Company, Duncan, Okla.

Filed Apr. 18, 1989, Ser. No. 340,110

Int. Cl.[5] E21B *43/17, 43/26*

U.S. Cl. 166—308 **9 Claims**



1. A method of fracturing a well, comprising:

(a) providing a mixing tub having a generally round horizontal cross-sectional shape, said tub containing a slurry made up of fracturing fluid and proppant;

(b) generating a radially inwardly rolling, generally toroidal shaped upper slurry flow zone adjacent an upper surface of said slurry in said tub, said toroidal shaped slurry flow zone having a center and a generally vertical central axis;

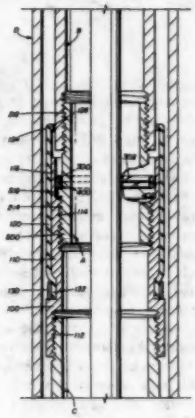
(c) introducing clean fracturing fluid downwardly into said center of said toroidal shaped upper slurry flow zone;
(d) introducing dry proppant into said toroidal shaped upper slurry flow zone;
(e) moving said dry proppant radially inward into contact with said clean fracturing fluid in said center of said toroidal shaped upper slurry flow zone and thereby wetting said dry proppant with said clean fracturing fluid to form said slurry in said tub, said fracturing fluid and said dry proppant being introduced into said tub in a proportion such that said slurry in said tub is a relatively high density slurry having a solids-to-fluid ratio of greater than 10 lbs/gal; and
(f) pumping said slurry down into said well and thereby fracturing a subsurface formation of said well.

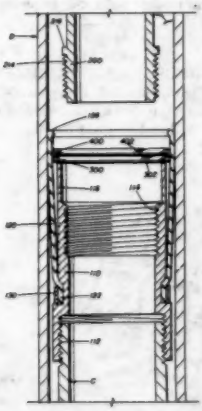
4,930,577

WELL SEALING APPARATUS AND METHOD

Charles Grantom, 2712 Frank Rd., Houston, Tex. 77032

Filed May 5, 1989, Ser. No. 348,207
Int. Cl.[5] E21B *33/12*
U.S. Cl. 166—387 **12 Claims**





1. A sealing apparatus adapted to be run into a well, comprising:
an elongate running-in tool having a cylindrical packer and a cylindrical adaptor releasably engaging said packer;
an annular resilient sealing element mounted on said running-in tool and disposed externally thereof for engagement with the well; and
a split ring expander means positioned on said running-in tool internally of said sealing element and adapted to expand radially outwardly from a retracted position on said running-in tool to an expanded position for urging said sealing element into sealing engagement with the well.

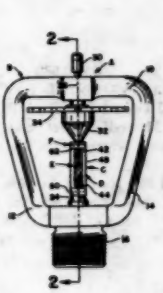
12. A method of sealing a well, comprising the steps of:
threading an adaptor onto a tubular member;
releasably engaging a cylindrical packer having a resilient sealing element with the adaptor;
positioning at least one expander means in a compressed position between the adaptor and the packer;
lowering the packer into the well;
disengaging the packer from the adaptor; and
releasing the expander means during the step of disengaging the packer from the adaptor to operably allow the expander means to urge the resilient sealing element against the well.

4,930,578

AUTOMATIC SPRINKLER

Charles B. Barnett, and Leonid Rabinovich, both of Akron, Ohio, assignors to Figgie International, Inc., Willoughby, Ohio

Filed Mar. 31, 1988, Ser. No. 175,538
Int. Cl.[5] A62C *37/14*
U.S. Cl. 169—39 **35 Claims**



1. A force transmitting mechanism including strut means and frangible means for transmitting force longitudinally therethrough, each of said strut means and frangible means having a force input end portion and a force output end portion, said force input end portions being spaced-apart, output force combining means for combining the output forces from said force output end portions, and input force dividing means for dividing an input force between said force input end portions such that substantially less than one-half of the input force is transmitted through said frangible meansand the remainder of the input force is transmitted through said strut means.

4,930,579

FIRE EXTINGUISHING DEVICE FOR THE HOME HEATING PLANT UTILIZING AN EXISTING SPIGOT AS THE WATER SOURCE

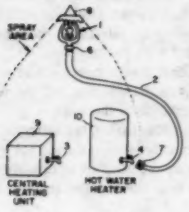
Gary George, 100 Kings Grant, Weston, Mass. 02193

Continuation of Ser. No. 158,986, Feb. 18, 1988, abandoned. This application Aug. 18, 1989, Ser. No. 396,740
Int. Cl.[5] A62C *3/00*
U.S. Cl. 169—54 **25 Claims**

1. A portable automatic fire extinguishing device retrofit in an area of a domestic dwelling in which a water dependent heat system with a dedicated water supply has been previously installed, the device comprising:

spray means which automatically operate at a predetermined temperature; and

a transfer line having one end disengageably connected to the spray means and an opposite end disengageably connected to a pre-existing drain spigot of the water dependent heat system, so as to provide the spray means with a supply of water which is initially supplied to the water



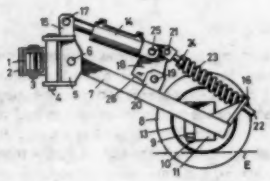
dependent heat system from the dedicated water supply and is subsequently drained from the system through the drain spigot and into the transfer line, the spray means automatically spraying water drained from the system through the drain spigot of the system to the area in response to a fire therein, the drain spigot serving as a positive pressure source of water to the transfer line.

4,930,580

VEHICLE MOUNTED LAWN EDGER

Jarvis R. Fuss, 143 Tourist Road; Eric W. Fuss, 3 Heller Street; Roy M. Fuss, 21 Leslie Street, and Roger D. Fuss, Mail Service 1497, Anzac Avenue, all of Toowoomba, 4350 Queensland, Australia

Filed Jul. 26, 1988, Ser. No. 224,463
Claims priority, application Australia, Jul. 31, 1987, PI3449
Int. Cl.[5] A01D *34/84*
U.S. Cl. 172—15 **7 Claims**



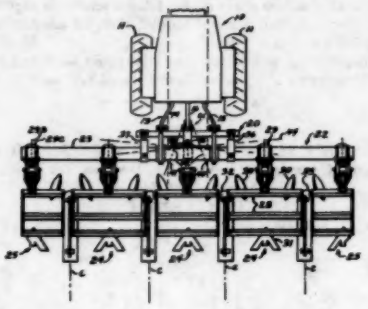
1. An edge cutter adapted to be supported on transport means and to cut along a guide on the surface on which the transport means moves, said edge cutter comprising: a support bracket adapted to be mounted on the transport means; a pivoting bracket carried by a vertical pivot pin on said support bracket; a support arm engaged at a first end on a horizontal pivot pin on said pivoting bracket whereby a second end of the support arm can move laterally and rise and fall; a bearing housing carried on the second end of the support arm by a vertical orientation pin on the support arm, a disc-shaped cutter member supported on a horizontal axle remote from the axis of the vertical orientation pin whereby the cutter arm trails the orientation pin to allow such cutter member to caster to a line with said guide when in contact with said guide; means on a support arm to urge the cutter member toward said guide; and means to limit the operating depth of the cutter member.

4,930,581

GUIDANCE CONTROL APPARATUS FOR AGRICULTURAL IMPLEMENT

Mathew W. Fleischer, and John C. David, both of Columbus, Nebr., assignors to Fleischer Manufacturing, Inc., Columbus, Nebr.

Filed May 10, 1988, Ser. No. 192,464
Int. Cl.[5] A01B *69/06*
U.S. Cl. 172—6 **8 Claims**



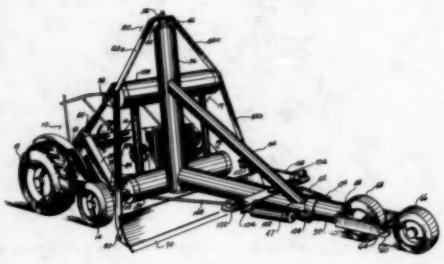
5. Apparatus for guiding an implement relative to a desired path, said implement adapted to be drawn by a tractor having a hitch including first and second diverging draft links, said implement including a frame and a plurality of coulters attached to said frame such that said coulters may not normally rotate about a vertical axis relative to said implement frame; first pivot mount means connected to said first and second draft links; second pivot mount means connected to said implement frame and cooperating with said first pivot mount means for forming a vertical pivot connection on the centerline of said tractor and said implement such that said implement may pivot about a vertical pivot axis; sensor means for sensing the position of said implement frame relative to said desired path; power actuator means coupling said first and second pivot mount means together and responsive to said sensor means for turning said implement frame about said vertical pivot axis and toward said desired path when said sensor means senses a deviation of the position of said implement frame from said desired path, thereby to move said implement toward said desired path as said tractor pulls said implement forward.

4,930,582

ROAD GRADER ATTACHMENT

George T. Goss, Rte. 3, Box 360, Picayune, Miss. 39466

Filed Oct. 6, 1988, Ser. No. 254,251
Int. Cl.[5] E02F *3/76*
U.S. Cl. 172—788 **12 Claims**



1. An apparatus to adapt a relatively short wheel base tractor to a long wheel base road grader comprising:

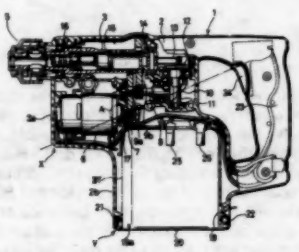
(a) first support arm means, pivotally affixed to said tractor;
(b) first tilt means adapted to rotate said first arm means with respect to said tractor;
(c) frame means pivotally affixed at a forward end of said support arms means, said frame means defining a first axis of said apparatus which is longitudinally aligned with said tractor;
(d) second tilt means for tilting said frame means about said forward end of said support arm means;
(e) wheel support means at the tip of said frame means distal from said forward end;
(f) a blade support frame pivotally affixed to an upper end of said frame means, vertically depending therefrom;
(g) blade means horizontally affixed at a lower end of said support frame;
(h) means, interconnecting said frame means and said blade means, for translating said blade means generally transverse to said first axis of said frame means; and
(i) means associated with said frame means for angling said blade means about a second generally vertical axis.

4,930,583

PORTABLE BATTERY-POWERED TOOL

Fusao Fushiya; Takashi Yamazaki, and Mikio Saito, all of Anjo, Japan, assignors to Makita Electric Works, Ltd., Japan

Filed Oct. 11, 1988, Ser. No. 255,824
Claims priority, application Japan, Feb. 17, 1988, 63-34168
Int. Cl.[5] B23B *45/02*
U.S. Cl. 173—109 **4 Claims**



1. In a portable, cordless battery-powered tool having (a) a spindle to which a bit is to be attached and which has a central axis, (b) an electric motor for imparting a rotary motion to the spindle and moving the bit, said spindle and said electric motor each being housed in a first housing section, (c) a battery housing section and (d) a handle section, the improvement wherein

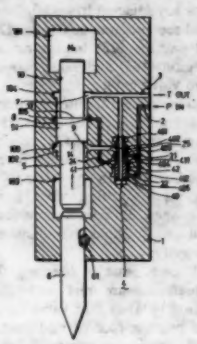
(i) the handle section forms a rearmost part of the tool,
(ii) the motor is located forwardly of the handle section,
(iii) the motor has a rotatable shaft located in parallel with the spindle,
(iv) the battery housing section is located between the handle section and the motor along the direction of the central axis of the spindle, and,
(v) the handle section is provided with a trigger means for energizing the motor which is substantially aligned with the central axis of the spindle at its top, said first housing section having a first edge such that the center of gravity of the tool lies along a line between the trigger and said first edge and said battery housing section having a second edge located in a forward and bottom region of said battery housing and intersecting a line which is perpendicular to the central axis and passes through the center of gravity of the tool, so that said tool is balanced in operation when supported by an operator's hand at either one of said first or second edges.

4,930,584

CRACKING DEVICE

Lai Chaur Ching, Kaohsiung City, and Huang Wen Ho, Tainan Hsien, both of Taiwan, assignors to Easy Industries Co., Ltd., Kaohsiung, Taiwan

Filed May 4, 1989, Ser. No. 347,083
Int. Cl.[5] B25D *9/18*
U.S. Cl. 173—116 **1 Claim**



1. A cracking device comprising;
a housing body having an elongated cavity opening at one side of said cavity;
an elongated piston provided movably in said cavity and having a single first annular flange around an intermediate portion of said piston, said first annular flange having an upper bearing face and a lower bearing face;
a hammer rod having a portion, mounted in said cavity, and a remaining portion extending outward;
said cavity forming a gas chamber around a top end of said piston, an annular hydraulic chamber around said piston adjacent to said first annular flange, and an impact chamber around a bottom end of said piston and around a top end of said hammer rod; said hydraulic chamber having a low pressure region (**104**), a high pressure region (**102**) and a control region (**105**) between said low and high pressure regions; said first annular flange moving between said low and high pressure regions during the operation of said piston;
a gas provided in said gas chamber to act on said top end of said piston;
an hydraulic fluid for operating in said hydraulic chamber;
a low pressure fluid outlet port (T) provided in said housing;
a high pressure fluid inlet port (P) provided in said housing;
a valve cavity provided in said housing adjacent to said piston;
a control valve provided in said valve cavity, said control valve being movable between a first position and a second position, said first position permitting a fluid communication between said high pressure region and said high pressure fluid inlet port after said piston strikes said hammer rod, said second position permitting a fluid communication between said high pressure region and said low pressure region after said elongated piston reaches an upper limit level, and at the same time, permitting the hydraulic fluid to flow from said high pressure region to said low pressure fluid outlet port;
said control valve having an outward second annular flange (**42**) which has a first annular bearing face (**411**) and a second annular bearing face (**412**) opposite to said first annular bearing face, said first bearing face having an area greater than that of said second bearing face;
said valve cavity having a first valve chamber portion around said second annular flange, said second annular flange dividing said first valve chamber portion into first

and second variable volume regions (404, 405), said valve cavity further having a second, a third and a fourth valve chamber portion, said second and third valve chamber portions being arranged between said first and fourth valve chamber portions;

a first fluid passage (3) intercommunicating said low pressure region (104) and said low pressure fluid outlet port (T);

a second fluid passage (24) intercommunicating said control region (105) and the one (404) of said variable volume regions which is adjacent to said first annular bearing face (411) of said second annular flange (42);

a third fluid passage (25) intercommunicating said high pressure region (102) and said second chamber portion (402) of said valve cavity;

a fourth fluid passage (2) intercommunicating said high pressure fluid inlet port (P) and said valve cavity, and having a first branch passage (21) communicated with said third chamber portion (403) and a second branch passage (22) communicated with the other (405) of said variable volume regions of said first valve chamber portion; and

a fifth fluid passage (231) intercommunicating said first fluid passage and said fourth valve chamber portion (401) of said valve cavity;

said second branch passage directing the hydraulic fluid from said high pressure inlet port to said other variable volume region (405) of said valve cavity so as to act on said second bearing face of said control valve, thereby moving said control valve towards said first position;

said second fluid passage directing the hydraulic fluid to flow from said high pressure region of said hydraulic chamber to said one variable volume region of said valve cavity to act on said first bearing face of said control valve so as to move said control valve to said second position; and

said third fluid passage (25) communicating with said first fluid passage through said fifth passage when said control valve is in said second position, thereby permitting the hydraulic fluid to flow from said high pressure region to said low pressure region.

4,930,585

DEVICE FOR DRILLING BOREHOLE UNDERCUTS

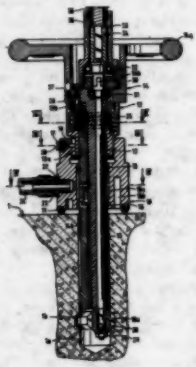
Martin Noser, Vaduz, Liechtenstein, and Fritz Mark, Mäder, Austria, assignors to Hilti Aktiengesellschaft, Fürstentum, Liechtenstein

Filed Mar. 23, 1989, Ser. No. 328,114

Claims priority, application Fed. Rep. of Germany, Mar. 23, 1988, 3809761

Int. Cl.[5] B28D *1/14*; E21B *7/28*

U.S. Cl. 175—220 10 Claims



1. Device for drilling an undercut section in a borehole in a target material comprising a housing (10, 12) arranged to abut an outer surface of a target material containing the borehole, an axially extending bore extending through said housing, a guide sleeve (13) mounted in said bore in said housing and having an eccentric bore in axially parallel relation with said housing bore, an eccentric bushing (14) positioned within said eccentric bore in said guide sleeve and rotationally displaceable through an angle of approximately 180° relative to said guide sleeve, a drive shaft (15) having a cutter head (28) thereon rotatably supported in said eccentric bushing, a driving unit coupled to said drive shaft, wherein the improvement comprises blocking means (25) disposed between said housing and said guide sleeve for permitting rotation of said guide sleeve relative to said housing in only one rotational direction.

4,930,586

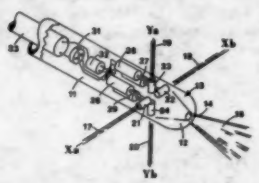
HYDRAULIC DRILLING APPARATUS AND METHOD

Paul S. Turin; Robert D. Wilkes, Jr., both of Berkeley, and Rowe Hakes, Bakersfield, all of Calif., assignors to Ben Wade Oakes Dickinson, III, San Francisco and Robert Wayne Dickinson, San Rafael, both of, Calif.

Filed May 12, 1989, Ser. No. 351,244

Int. Cl.[5] E21B *7/18, 47/024*

U.S. Cl. 175—25 19 Claims



1. In apparatus for drilling a borehole in the earth: a drill head having means for discharging a cutting jet of drilling fluid in a generally axial direction to form the borehole, means for supplying pressurized drilling fluid to the drill head, a radially directed nozzle for discharging a portion of the drilling fluid in a radial direction to control the position of the drill head within the borehole, means for sensing the orientation of the drill head, and valve means responsive to the sensing means for controlling delivery of the fluid to the radially directed nozzle.

15. In a method of drilling a borehole in the earth, the steps of: supplying pressurized drilling fluid to a drill head, discharging a cutting jet of the drilling fluid in a first direction to form the borehole, discharging a portion of the drilling fluid through an orifice controlled by a poppet valve in a second direction to control the orientation of the drill head within the borehole, providing an electrical signal corresponding to the orientation of the drill head relative to a horizontal axis, and controlling the operation of a poppet valve in response to the electrical signal.

4,930,587

CORING TOOL

David E. Young, Seabrook; Earl T. Koskie, Jr., Conroe, and Andrew R. Easton, Oak Ridge North, all of Tex., assignors to Diamant Boart-Stratabit (USA) Inc., Houston, Tex.

Continuation-in-part of Ser. No. 342,792, Apr. 25, 1989, abandoned. This application Aug. 28, 1989, Ser. No. 400,132

Int. Cl.[5] E21B *10/02, 25/14*

U.S. Cl. 175—251 11 Claims

1. A coring tool adapted to be mounted at a lower end of a drill string for cutting and catching a subterranean core, comprising:

outer barrel means including a hollow drill bit disposed at a lower end of said barrel means and adapted to be rotated about a vertical longitudinal axis for cutting a core, and

inner barrel means disposed coaxially within said outer

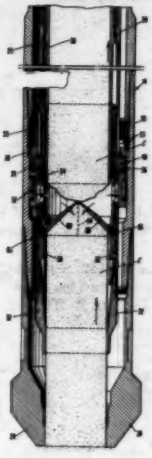
barrel means and including jaw carrier means, driver sleeve means disposed coaxially within said jaw carrier means, and jaw closing means disposed laterally between said jaw carrier means and said driver sleeve means,

said jaw carrier means mounted for longitudinal displacement relative to said outer barrel means and including a downwardly facing stop surface, and jaw means arranged to be laterally inwardly displaced from a rest position to a core catching position,

said jaw closing means disposed above and in a longitudinal path of travel of said jaw means,

said jaw carrier means arranged to be upwardly displaceable relative to said jaw closing means in response to upward movement of said jaw carrier means relative to said outer barrel,

said driver sleeve extending radially inwardly of, and downwardly past, said jaw means to radially cover said



jaw means during a core cutting operation and including an upwardly facing abutment face, said driver sleeve being arranged to be upwardly displaced relative to both said jaw carrier means and said jaw-closing means in response to the application of upward force to said driver sleeve by a drill string to radially uncover said jaw means and bring said abutment face into engagement with said stop surface to displace said jaw carrier means upwardly relatively to said outer barrel such that said jaw means is raised into contact with said jaw closing means and is subjected to a deflecting force therefrom which deflects said jaw means from said rest position to said core-catching position, said jaw-closing means being operably connected to said outer barrel means such that the weight of said outer barrel means is applied downwardly against said jaw means through said jaw-closing means.

4,930,588

ELECTRONIC BALANCE

Otto Kuhlmann; Walter Södler, and Eberhard Stadler, all of Göttingen, Fed. Rep. of Germany, assignors to Sartorius GmbH, Göttingen, Fed. Rep. of Germany

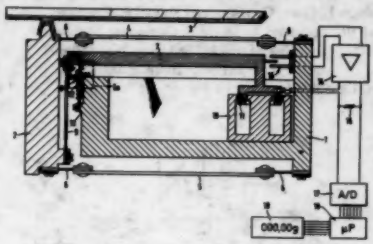
Filed Aug. 28, 1989, Ser. No. 398,958

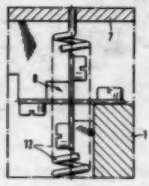
Claims priority, application Fed. Rep. of Germany, Sep. 1, 1988, 3829637

Int. Cl.[5] G01G *7/00, 23/14*

U.S. Cl. 177—212 **6 Claims**

1. An electronic balance with a balance scale which is connected via a parallel guide to a system carrier, and with a translation lever which is rotatably mounted on the system carrier and onto the shorter lever arm of which the force of the weight acting on the balance scale is transferred via a coupling element and on the longer arm of which the coil of an electro-





magnetic compensation of force is fastened, characterized in that at last one spring touches the translation lever for the purpose of astatization, the line of application of which spring passes through the point of rotation of the translation lever.

4,930,589

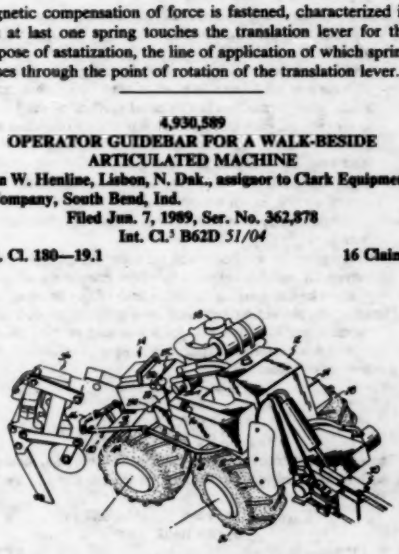
OPERATOR GUIDEBAR FOR A WALK-BESIDE ARTICULATED MACHINE

John W. Henline, Lisbon, N. Dak., assignor to Clark Equipment Company, South Bend, Ind.

Filed Jun. 7, 1989, Ser. No. 362,878

Int. Cl.[5] B62D *51/04*

U.S. Cl. 180—19.1 **16 Claims**



1. A guidebar for a walk-beside, articulated machine having a first machine portion and a second machine portion which swivel about a pivot point, the guidebar comprising:

a first bar portion, having a first end and a swivel end, fixably attached to and extending along a side of the first machine portion;

a swing arm, having a first swing arm end and a second swing arm end, the first swing arm end being pivotally attached to the second machine portion; and

a second bar portion extending along a side of the second machine portion and having a first end and a second end, the first end being pivotally attached to the second swing

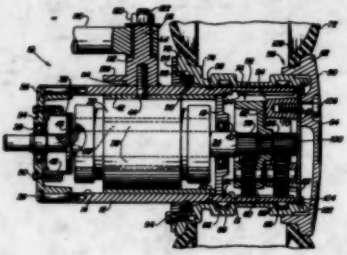
arm end and the second end being pivotally attached to the swivel end of the first bar portion.

4,930,590

MOTOR AND TRANSMISSION ASSEMBLY

Mahlon L. Love, Geneseo, and Daniel L. Leemans, Moline, both of Ill., assignors to Deere & Company, Moline, Ill.

Filed May 11, 1989, Ser. No. 350,669
Int. Cl.[5] B60K 7/00
U.S. Cl. 180—55 **7 Claims**



1. A combined drive motor and gearing unit comprising:
- a single piece housing divided into a motor chamber and a gearing chamber by a bulkhead;
- a motor in the motor chamber having an output shaft extending into the gearing chamber through an opening provided in the bulkhead;
- a planetary reduction gear system in the gearing chamber including at least one sun gear, at least one planet carrier, a ring gear formed on the internal surface of the housing as an integral part thereof, and a plurality of planet gears carried by the at least one carrier and meshing with the at least one sun gear and the ring gear;
- one of the at least one sun gear and at least one carrier being driven by the motor output shaft to provide the input to the planetary system and another providing the planetary output;
- a driven member secured to the planetary output for rotation therewith and including a portion encircling at least a portion of the gearing chamber end of the housing; and
- bearing means acting between said portion of said driven member and said at least a portion of said gearing chamber end of said housing to rotatably support said driven member on said housing.

4,930,591

GOLF CART OR THE LIKE

Charles Lanius, Prairie du Sac, and Mark Gilbertson, Sauk City, both of Wis., assignors to Columbia Parcar Corp., Deerfield, Wis.

Filed Jul. 28, 1989, Ser. No. 387,149
Int. Cl.[5] B60K 1/00
U.S. Cl. 180—65.1 **8 Claims**

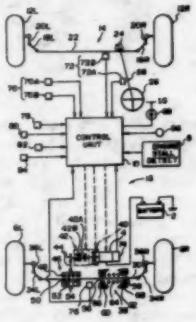
1. In a golf cart having a frame, a pair of front and rear wheels supporting said frame, an engine and battery mounted on said frame forwardly of said rear wheels in an engine compartment, the improvement comprising
- a first clam shell enclosing the forward portion of said engine compartment,
  - said first clam shell being pivotally mounted on said frame forwardly of said compartment,
- a pair of seats secured to the upper surface of said first clam shell enclosure,
- a second clam shell complementing said first clam shell to enclose completely said engine compartment,
  - said second clam shell being pivotally mounted on said frame rearwardly of said engine compartment behind said rear wheels,
- said first and second clam shells having cooperating inner edges which abut when said clam shells are in closed position to provide a smooth continuous shell enclosure for said engine compartment.

4,930,592

REAR WHEEL TURNING SYSTEM FOR A VEHICLE

Hiroshi Ohmura, Hiroshima, Japan, assignor to Mazda Motor Corporation

Filed Jul. 3, 1989, Ser. No. 374,695
Claims priority, application Japan, Jul. 4, 1988, 63-166384
Int. Cl.[5] B62D 5/04
U.S. Cl. 180—79.1 **14 Claims**



1. A rear wheel turning system for turning rear wheels of an engine driven vehicle in response to turning of front wheels of the vehicle comprising an actuator including an electric motor which is energized by a battery, the battery being mounted on the vehicle body and charged by an alternator driven by the engine, a rear wheel turning mechanism which is driven by the electric motor and turns the rear wheels, and a control means which outputs a control signal to the electric motor in order to cause the rear wheels to turn to a predetermined turning angle according to the operating condition of the vehicle, characterized in that
- an engine stall detecting means which detects that the engine stalls and outputs a detecting signal is provided, and
- said control means is arranged to cease controlling the electric motor when a predetermined condition is established after the engine stall detecting means outputs the detecting signal.

4,930,593

PIVOTING SEAT STRUCTURE FOR A FRONT MOUNTED MOWER

James A. Swartzendruber, West Bend, and Dale R. Dobberpuhl, Horicon, both of Wis., assignors to Deere & Company, Moline, Ill.

Filed Mar. 23, 1989, Ser. No. 327,947
Int. Cl.[5] B62D *25/10, 39/00*
U.S. Cl. 180—89.17 9 Claims

1. In a vehicle having a frame supported for forward movement over the ground, an operator station including a forward steering column, an engine located rearwardly of the operator station, a drivable implement supported forwardly of the operator station, and drive structure extending between the engine and implement under the operator station, seat structure comprising:

a fore-and-aft extending seat support pivotally connected to the frame at one of its ends for rocking both the horizontal working position wherein the operator station is substantially closed over the drive structure, and an upright access position wherein the operator station opens downwardly toward the drive structure;

a seat including a lower portion and an upright seatback portion, and means pivotally connecting the seat to the end of the seat support opposite said one of its end for freely pivoting about a transverse axis between a seating position with the lower portion generally parallel to the seat support and an offset position wherein the seatback approaches an attitude generally parallel to the seat support;

means for securing the seat support in the upright access position with the seat in the offset position; and

wherein the seat support is pivotally connected at its forward end to the vehicle frame rearwardly of the steering column whereby the lower portion of the seat extends over the steering column when the seat support is in the access position when the seat in the offset position.

4,930,594

DEVICE FOR CONTROLLING MOTOR VEHICLE TO RUN AT CONSTANT SPEED

Toshifumi Koshizawa, Kawasaki; Satoshi Yamaguchi, Tokyo; Hiroshi Yoshimura, Hiroshima, and Youichi Iida, Kawasaki, all of Japan, assignors to Isuzu Motors Limited, Tokyo, Japan

Filed Apr. 28, 1988, Ser. No. 187,541
Claims priority, application Japan, Apr. 28, 1987, 62-105980
Int. Cl.[5] B60K *31/04*
U.S. Cl. 180—179 11 Claims

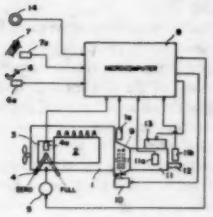
1. A constant-speed controlling device for controlling a motor vehicle having a transmission with a gear position and a preset constant speed at which the motor vehicle is to run, including an electronic controller for controlling a device providing an amount of fuel to an engine of the motor vehicle based on a difference between the preset constant speed at which the motor vehicle is to run and a speed at which the motor vehicle is running, said constant-speed controlling device comprising:

detecting means for detecting the speed at which the motor vehicle is running;

setting means for setting the preset constant speed at which the motor vehicle is to run;

resistance means for determining a resistance to the running of the motor vehicle;

first calculating means for calculating a target engine rotational speed based on the preset constant speed and the gear position of the transmission while the motor vehicle is running;



second calculating means for calculating an upper limit for the amount of fuel provided by the device to maintain the engine at said target engine rotational speed responsive to said target engine rotational speed and said resistance to the running of the motor vehicle; and

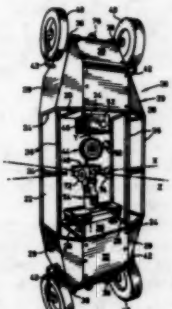
controlling means for controlling the device providing an amount of fuel, to limit the amount of fuel below said upper limit based on said preset constant speed and said speed at which the motor vehicle is running.

4,930,595

METHOD AND APPARATUS FOR DETERMINING THE PROFILE OF A SUBTERRANEAN PASSAGE

Alan G. Hayward, Dowling; Lauri C. Gregg, Hanmer; Aurele L. Dutrisac, Beizzard Valley, and Jack J. Joliat, Biezzard Valley, all of Canada, assignors to Falconbridge Limited, Toronto, Canada

Filed Oct. 14, 1987, Ser. No. 108,504
Claims priority, application Canada, Oct. 14, 1986, 520432
Int. Cl.[5] G01V *1/40*
U.S. Cl. 181—104 16 Claims



1. A method of remotely determining the profile of a subterranean passage, comprising the steps of:

providing an instrument pod that is capable of being moved along the passage and that includes: rangefinder means capable of determining the distances from a defined longitudinal axis of the pod of multiple points on the internal wall of the passage lying in a common plane normal to

said axis, and of providing an output signal indicative of said distances and representing the profile of the passage in said plane; and clinometer means capable of providing an output signal indicative of the orientation of the pod in the passageway;

positioning said pod at a known location in a passage the profile of which is to be determined;

remotely monitoring the output signals of the rangefinder means and clinometer means;

generating from the output signal of the rangefinder means a visual representation of the profile of the passage at said known location;

moving the pod to successive subsequent locations each at a known distance along the passage from a preceding location, the pod being of a robust construction permitting said movement of the pod through an inclined said passage in contact with a wall thereof and said pod including means protecting said rangefinder means and clinometer means against damage due to impacts with said passage wall, the pod comprising a skid platform having a bottom surface defined by a skid plate, and a frame coupled to said skid plate and defining a cage surrounding said rangefinder means and clinometer means; said skid platform and frame providing said robust construction and said protecting means;

at each said subsequent location, generating a visual representation of the profile of the passage from the rangefinder output signal.

4,930,596

LOUDSPEAKER SYSTEM

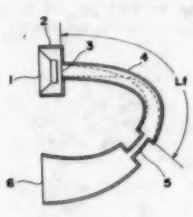
Syuji Saiki, Hirakata; Kazue Sato, Neyagawa, and Kazuki Honda, Katano, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jun. 9, 1988, Ser. No. 204,523

Claims priority, application Japan, Jun. 16, 1987, 62-149647; Jul. 16, 1987, 62-177427; Oct. 1, 1987, 62-248718; Mar. 22, 1988, 63-68563

Int. Cl.[4] G10K *11/10*; H05K *5/00*

U.S. Cl. 181—152 **12 Claims**



1. A loudspeaker system comprising:

a loudspeaker unit having means for radiating a first sound from a front thereof;

a horn unit having a throat coupled to a back of the loudspeaker unit for radiating a second sound; and

an acoustic filter in said horn for causing an acoustic impedance of the horn unit to be discontinuous, said horn unit having a length from said throat to said acoustic filter for causing said length of said horn to produce a primary harmonic resonance at a frequency f_d, said frequency f_d being a frequency equal to a minimum frequency in an interference portion of a combined sound made up of said first sound and said second sound after said second sound has passed through said horn and radiated outwardly from the mouth of the horn, which harmonic resonance is similar to that produced by a straight acoustic tube having opposite ends thereof closed.

4,930,597

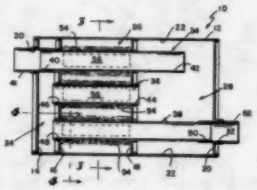
NOISE ATTENUATION APPARATUS

Randal R. Udell, Columbus, Ind., assignor to Arvin Industries, Inc., Columbus, Ind.

Filed Apr. 7, 1989, Ser. No. 334,901

Int. Cl.[5] F01N *1/10*

U.S. Cl. 181—256 **9 Claims**



1. A noise attenuation apparatus comprising

a hollow muffler housing,

dividing means in the hollow muffler housing for dividing the muffler housing into at least two muffler chambers,

an exhaust tube extending through the dividing means and lying in a mounted position within the muffler housing to interconnect at least two of the muffler chambers in fluid communication, the exhaust tube having a side wall formed to include a plurality of exhaust openings, and

a self-supported open-ended tube sock formed to include an inner wall defining a cylindrical passage extending therethrough and an exposed outer wall spaced from the hollow muffler housing, the tube sock being made of a filter material configured to provide means for attenuating noise of exhaust passed therethrough, the exhaust tube being disposed in the cylindrical passage of the tube sock to position the side wall exhaust openings in confronting relation to the inner wall of the open-ended tube sock so that noise generated by exhaust conducted through the exhaust tube is attenuated as the exhaust exits the exhaust tube through the side wall exhaust openings and passes through the adjacent open-ended tube sock into at least one of the muffler chambers.

4,930,598

SCISSORS LIFT APPARATUS

William D. Murrill, Tucker, and Mark W. Rhodes, Lawrenceville, both of Ga., assignors to 501 Sky Climber, Inc., Stone Mountain, Ga.

Filed Jul. 25, 1988, Ser. No. 223,478

Int. Cl.[5] E04G *1/22*, *1/34*

U.S. Cl. 182—63 **35 Claims**

1. A scissors lift apparatus comprising:

a support;

a platform;

a plurality of scissor arm assemblies connecting the support to the platform, each arm assembly comprising a center arm and two outside support arms pivotably connected at their longitudinal midpoints to define a pivot axis, adjacent assemblies pivotally connecting in series a center arm end to an adjacent center arm end and outside arm ends to adjacent outside arm ends;

pin and roller means for connecting the lowermost scissor

arm assembly to the support for connecting the uppermost scissor arm assembly to the platform; and

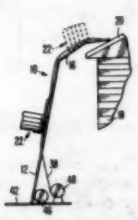
a hydraulic cylinder pivotally mounted to the support and to the longitudinal midpoint of the center arm of the lowermost scissor arm assembly.

4,930,599

LADDER AND CARRIAGE COMBINATION

Ernest L. Simms, Sr., Route 60, Hines, W. Va. 25967

Filed Aug. 17, 1989, Ser. No. 394,798
Int. Cl.[5] E06C 7/12, 7/48
U.S. Cl. 182—103 3 Claims



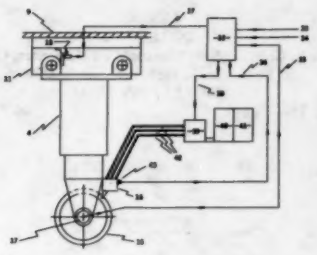
1. In combination, a ladder having a pair of parallel, upright rails and a plurality of horizontal rungs spanning and cross-connecting the rails, the upper ends of rails being extended at their upper ends in bow-like fashion to enable said ends to reach at least partly over a roof or the like, a carriage carried by the rails for up and down movement, the carriage having a platform part generally normal to the plane of the ladder and a back part joined to and extending upwardly from the platform and normally lying along the rails, said back part being flexible to enable the back part to accommodate itself to the bow-like upper ends of the rails, and means for moving the carriage up and down the rails; in which, the back part comprises upper and lower portions, the lower portion being rigid with the platform and the upper part being hinged to the lower part on a horizontal axis to provide for the afore-said flexibility.

4,930,600

INTELLIGENT ON-BOARD RAIL LUBICATION SYSTEM FOR CURVED AND TANGENT TRACK

Sudhir Kumar, and Shiv R. Kumar, both of Westmont, Ill., assignors to Transrgy Corporation, Westmont, Ill.

Filed Nov. 21, 1988, Ser. No. 274,326
Int. Cl.[5] B61K 3/00
U.S. Cl. 184—3.2 28 Claims



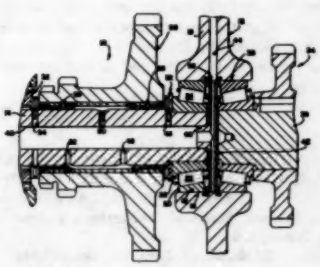
1. A method of operating a train on railroad track with reduced train resistance, comprising the steps of applying a continuous film of non-volatile, organic lubricant which is non-freezing under operating conditions to the crown of at least one track rail at a point behind the last tractive wheels of the train's locomotive, the lubricant being applied on both tangent and curved track, and applying a second lubricant to the gage side of at least one rail.

4,930,601

LUBRICATION SYSTEM FOR A TRANSMISSION MECHANISM

Henry A. Leidecker, Libertyville, Ill., and Gary R. Woerman, Queen Creek, Ariz., assignors to J. I. Case Company, Racine, Wis.

Filed Feb. 9, 1989, Ser. No. 308,270
Int. Cl.[5] F01M 9/00
U.S. Cl. 184—6.12 7 Claims



1. A lubrication system for a mechanism requiring lubrication, said mechanism including an axially extended shaft rotatably mounted by bearings in a housing, said shaft having a member rotatably supported thereon, said lubrication system comprising:

an axially extended, open-ended fluid passage defined by said shaft, said passage including at least one port through which fluid is exhausted to lubricate the member on the shaft;

a fluid conduit defined by said housing, an open-end of said conduit being radially spaced from the open-end of said shaft; and

fluid diverter means arranged at the open-end of said shaft

for fluidically joining the fluid passage and the fluid conduit, said fluid diverter means including a concentric hollow pilot portion extending at least partially within said fluid passage, said fluid diverter means further defining at least one open-ended channel radially extending from and joined in fluid communication with said hollow pilot portion for directing fluid flow between the fluid conduit and the fluid passage.

4,930,602

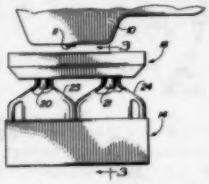
OIL DRAIN SYSTEM

Kenneth K. Gust, 6325 W. Mansfield #224, Denver, Colo. 80235

Filed Apr. 3, 1989, Ser. No. 332,513

Int. Cl.[5] F16N *31/00*

U.S. Cl. 184—106 **20 Claims**



1. A drain system for draining spent liquids from a motor vehicle and supplying such liquids to movable receptacles, said systems including in combination:

a holder base member in the form of a generally rectangular box with a bottom, first and second upright sides, and first and second upright ends, said holder base member box having an open top for receiving at least first and second removable bottles, each having a reduced diameter open neck at the top thereof;

a double funnel receptacle means having a generally rectangular shape, with first and second spaced-apart openings located a predetermined distance apart in the bottom thereof; and

first and second spouts extending a predetermined distance downwardly from said first and second openings, respectively, in said receptacle means, said first and second spouts located for insertion into the reduced diameter open necks of such first and second containers, respectively.

4,930,603

METHOD AND APPARATUS FOR SERVING THE PASSENGER TRAFFIC AT A MAIN FLOOR OF AN ELEVATOR INSTALLATION

Richard Brenner, Stansstad, Switzerland, assignor to Inventio AG, Switzerland

Filed Jan. 12, 1989, Ser. No. 296,536

Claims priority, application Switzerland, Jan. 14, 1988, 00108/88-4

Int. Cl.[5] B66B *1/20*

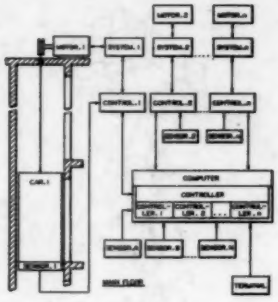
U.S. Cl. 187—125 **33 Claims**

1. A method for serving building-filling passenger traffic at a main floor of an elevator group having a plurality of elevator cars, comprising the steps of:

a. determining a total transport capacity value according to a first algorithm dependent upon measured building-filling passenger traffic arriving at and departing from a main floor;

b. assigning transport capacities according to said algorithm to a plurality of elevator cars of an elevator group, the sum of all said transport capacities being equal to said total transport capacity value; and

c. dispatching each of the elevator cars from the main floor according to a second algorithm based upon said assigned



transport capacities, a round trip time for each of the elevator cars, and an actual passenger load.

4,930,604

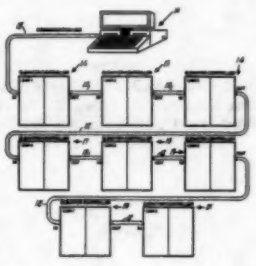
ELEVATOR DIAGNOSTIC MONITORING APPARATUS

Gregory A. Schienda, Southington, and Mark L. Mayfield, Bristol, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Oct. 31, 1988, Ser. No. 264,566

Int. Cl.[5] B66B *3/00*

U.S. Cl. 187—133 **10 Claims**



1. Apparatus for use with an elevator system having at least one car, comprising:

for each elevator car, signal processing means for monitoring the states of a plurality of two-state parameter signals indicative of a corresponding plurality of elevator parameters, said signal processing means determining the identity of an elevator operating state for an elevator car which normally operates sequentially from state to state in a closed loop sequential chain of linked normal operating states by detecting the satisfaction of a transition criterion defining a transition from an immediately preceding operating state or to an immediately succeeding operating state by detecting the parameter signal state or states, alone or in combination, of one or more sensed parameter signals defining the satisfied transition criterion, each criterion indicating either a transition to a normal operating state in the chain or to an abnormal operating state, and for providing selected message signals in the presence of corresponding selected transitions;

for each elevator car, an event buffer, responsive to a selected number of the latest to occur of selected parameter signal state changes, for storing state change signals indicative of said latest parameter signal state changes, said event buffer responsive to said selected message signals

for providing related buffer message signals corresponding to said stored state change signals;

for each elevator car, communication means, responsive to said selected message signals provided by said signal processing means, for transmission thereof, and responsive to said buffer message signals provided by said event buffer, for transmission thereof; characterized by:

monitor communication means, responsive to each of said elevator car communication means, for decoding said transmitted selected message signals and providing decoded signals indicative thereof, and for decoding said transmitted buffer message signals and providing decoded signals indicative thereof;

user input means for providing signals indicative of parameter limit values corresponding to parameter value transition criterion for said plurality of parameters monitored by each one of said elevator car signal processing means;

display means responsive to said monitor signal processing means;

monitor signal processing means, responsive to said monitor communication means, for providing signals indicative of said decoded selected message signals to said display means for display in a predetermined form, and for providing signals indicative of said decoded buffer message signals to said display means for display in a predetermined form, said monitor signal processing means being responsive to said user input means for providing signals indicative of said parameter limit value signals to said display means for display in a predetermined form, and for providing said signals indicative of said parameter limit value signals to said monitor communication means for transmission.

4,930,605

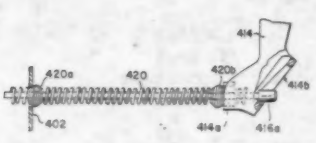
BRAKE APPARATUS WITH BLIND CABLE INSTALLING MEANS

Billy G. Boyer, Moberly; Lloyd M. Nelson, Blackwater; Wayne L. Soucie, Columbia, and William K. Hayes, Fayette, all of Mo., assignors to Orscheln Co., Moberly, Mo.

Continuation of Ser. No. 275,390, Nov. 23, 1988, Pat. No. 4,872,533. This application May 9, 1989, Ser. No. 349,033

Int. Cl.[5] F16D *51/00*

U.S. Cl. 188—2 D **4 Claims**



1. A blind-cable type parking brake assembly for operating brake shoe means relative to a brake surface associated with a wheel of a vehicle, comprising:

(a) a backing plate;

(b) a parking brake lever mounted for pivotal movement relative to said backing plate, said lever including spring support means adjacent one end thereof;

(c) a helical guide spring supported at one end by said spring support means, said spring extending, when in its initial normal non-compressed condition, at its other end through, and terminating at an extremity arranged slightly beyond an opening contained in said backing plate, said spring including a bell-shaped portion of enlarged outer diameter having turns that are tightly wound relative to the remaining portion of the spring, said bell-shaped portion being in engagement with the side of said backing plate adjacent said lever, thereby to limit the extent of longitudinal diplacement of said spring away from said lever;

(d) a coaxial parking brake cable assembly including a flexible resilient inner cable member terminating at one end in an enlarged extremity; and

(e) means connecting said inner cable member one end with said lever one end, said lever one end including a ramp portion spaced from said spring support means on the side thereof remote from said backing plate opening, said ramp portion having an inclined ramp surface facing said spring support means, said ramp portion containing a cable mounting opening so arranged and of such a size and configuration that said enlarged inner cable member extremity is operable for successive introduction through said spring, through said backing plate opening, and through said spring support means into sliding engagement with said ramp portion, whereby during the blind connection of said inner cable member with said lever, the end portion of said inner cable member initially rides up said ramp portion and subsequently extends through the ramp opening for resilient return toward a connected position in which the inner cable member is retained in said mounting opening by the engagement of said enlarged extremity with the rear surface of said ramp portion;

(f) said parking brake assembly further including an outer sleeve member (617), and self-connecting fitting means (650) mounted on said sleeve member for engaging said terminal spring portion to compress said spring longitudinally and for connecting said sleeve member with said backing plate opening.

4,930,606

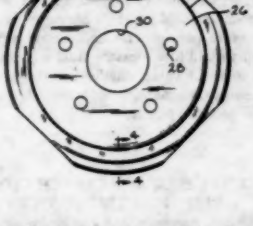
DISC BRAKE ROTOR

Robert S. Sporzynski, Chelsea; Anthony C. Evans, Northville, and Richard T. Robinette, St. Clair Shores, all of Mich., assignors to Kelsey-Hayes Company, Romulus, Mich.

Filed Jul. 26, 1988, Ser. No. 224,097

Int. Cl.[5] F16D *65/12*

U.S. Cl. 188—218 XL **13 Claims**



1. A composite disc brake rotor assembly comprising a hat section having an axis of rotation, a central mounting flange and a rim flange having a non-planar portion thereof, said rim flange connected to said mounting flange and generally extending radially outward from said axis, and a rotor discoid cast coaxially about said hat section enveloping, the non-planar portion of said rim flange such that braking forces applied to the rotor discoid are transmitted to said hat section.

4,930,607

VEHICULAR BRAKE HOLDING SYSTEM

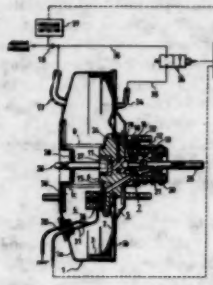
Morihiko Shimamura; Shinobu Kamono; Junichi Okuyama; Kunio Okano, and Naoki Komine, all of Saitama, Japan, assignors to Jidosha Kiki Co., Ltd., Tokyo, Japan

Filed Jul. 21, 1988, Ser. No. 222,657

Claims priority, application Japan, Jul. 29, 1987, 62-116411[U]; Oct. 22, 1987, 62-267547

Int. Cl.[5] B60K *41/20, 41/28*

U.S. Cl. 192—1.33 13 Claims



1. A vehicular brake device, comprising:

a power piston slidably supported in a shell;

a valve mechanism provided in a valve casing at a central portion of said piston and including a valve plunger;

a constant pressure chamber defined on a front side of said piston with regard to the direction of braking action thereof;

a variable pressure chamber defined on a rear side of said piston with regard to said direction;

a low pressure fluid source which is connected to said constant pressure chamber;

communication passages for connecting said constant pressure chamber and said variable pressure chamber to each other through said valve mechanism;

a pressure passage for connecting said variable pressure chamber and a high pressure fluid source to each other through said valve mechanism;

an input shaft which functions to put said valve plunger of said valve mechanism into action to switch fluid passages to disconnect said communication passages between said constant pressure chamber and said variable pressure chamber from each other and to feed a high pressure fluid from said pressure passage to said variable pressure chamber to move said piston forward;

a first solenoid valve which is capable of opening and closing one of said communication passages between said valve mechanism and said constant pressure chamber;

a low pressure passage connecting said variable pressure chamber to said low pressure fluid source; and

a second solenoid valve smaller in cross-sectional area of fluid passage than said first solenoid valve and provided in said low pressure passage.

4,930,608

TORQUE CONVERTER AND CLUTCH CONTROL WITH PIEZOELECTRIC DEVICES

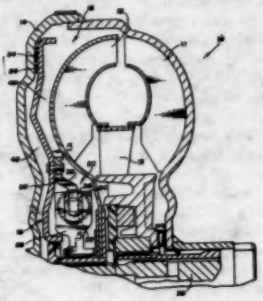
Donald E. Schenk, Vandalia, and Jon E. Miller, Spring Valley, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed May 8, 1989, Ser. No. 348,366

Int. Cl.[5] F16D *47/02, 43/00*

U.S. Cl. 192—3.29 3 Claims

1. A torque converter clutch assembly and control comprising: torsional damper means disposed in the torque converter clutch and being subjected therein to transient torsional impulses; an engagement chamber means for said torque converter clutch; a disengagement chamber means for said torque converter clutch; first piezoelectric means disposed on said damper means in a position to be stressed upon the transmission of a transient torsional impulse for generating a voltage proportional to the time rate of change of the transient torsional



impulse; and a second piezoelectric means disposed in one of said engagement and disengagement chamber means and being electrically connected with said first piezoelectric means for receiving a voltage signal therefrom and being expandable upon a predetermined voltage to initiate disengagement of said torque converter clutch.

4,930,609

GEARSHIFT LEVER INTERLOCK

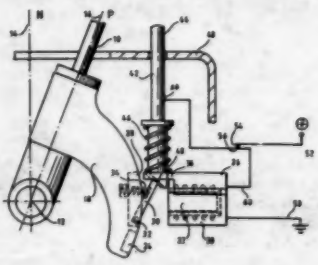
Wilhelm Bois, Gaimersheim; Franz Amberger, Neuenhinzenhausen, and Josef Buchl, Lenting, all of Fed. Rep. of Germany, assignors to Audi AG, Ingolstadt, Fed. Rep. of Germany

Filed Apr. 11, 1989, Ser. No. 336,023

Claims priority, application Fed. Rep. of Germany, Apr. 22, 1988, 3813653

Int. Cl.[5] B60K *41/26*; G05G *5/10*

U.S. Cl. 192—4 A 7 Claims



1. An interlock for a gearshift lever of an automatic transmission of a vehicle, the gearshift lever being movable through a series of positions including a park position and a neutral position, the interlock comprising an interlock element attached to said gearshift lever and movable in a predetermined path with the movement of said gearshift lever, an electrically controlled device including a moving means displaceable toward said interlock element upon energization of said electrically controlled device, said interlock element comprising a first locking means for engagement with said moving means to unlock the gearshift lever from the park position and a second locking means for engagement with said moving means to lock the

gearshift lever in the neutral position, wherein said electrically controlled device is deenergized to displace said moving means away from said interlock element thereby disengaging from said first locking means to lock said gearshift lever when in the park position and disengaging from said second locking means to unlock said gearshift lever when in the neutral position, and wherein said moving means is a pin extendable from said electrically controlled device when said device is energized, and

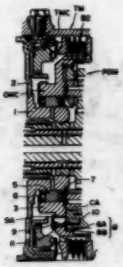
said first locking means includes a catch which rests against a stop when said gearshift lever is in the park position and which can be displaced from said stop by said pin when extended.

4,930,610

MOUNTING STRUCTURE FOR ONE-WAY CLUTCH IN AUTOMATIC TRANSMISSION

Setsukazu Akai, and Minoru Sawayama, both of Kyoto, Japan, assignors to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 14, 1988, Ser. No. 284,247
Claims priority, application Japan, Dec. 17, 1987, 62-191901
Int. Cl.[5] F16D *65/02*
U.S. Cl. 192—7 **4 Claims**



1. In a mounting structure for a one-way clutch in an automatic transmission of the type that a carrier of a planetary gear mechanism and a casing of the transmission are connected together by way of a one-way clutch allowing the carrier to rotate only in one direction about a central axis of rotation of the planetary gear mechanism, the improvement wherein a coupling member coupling the carrier and the one-way clutch to each other is splined at an end portion thereof, which is located on the side of the carrier, with the carrier so as to allow the carrier to play in a radial direction relative to the central axis of the rotation and a limiting member is provided to limit a range of sliding movements of the carrier along the central axis of rotation of the coupling member.

4,930,611

ROTARY TRAVEL LIMIT STOP

Duane H. Grimm, Rockford, Ill., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Jun. 2, 1989, Ser. No. 360,508
Int. Cl.[5] F16D *71/00, 65/14*
U.S. Cl. 192—139 **5 Claims**

1. A rotary travel limit stop apparatus, comprising:

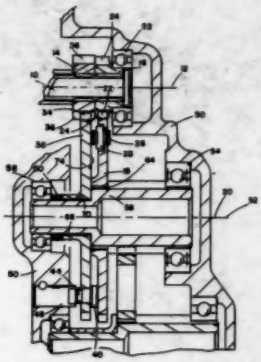
a first rotatable gear having a first axis of rotation;

a second rotatable gear having a second axis of rotation, said second rotatable gear being associated in gear mesh relation with said first rotatable gear;

third rotatable gear having a third axis of rotation, said third rotatable gear being associated in gear mesh relation with said first rotatable gear, said second rotatable gear having a number of teeth unequal to the number of teeth of said third rotatable gear, said second and third rotatable gears being associated in gear mesh relation with said first rotatable gear to rotate at different speeds about their respective axes of rotation in response to rotation of said first rotatable gear;

means connected to said second and third rotatable gears for causing said third rotatable gear to move axially away from said second rotatable gear when said first rotatable gear rotates a preselected number of rotations from a predefined initial position; and

means for stopping the rotation of said third rotatable gear



when said third rotatable gear moves axially away from said second rotatable gear, said stopping means comprising at least one movable stop rigidly attached to said third rotatable gear for rotation abut said third axis of rotation, said stopping means further comprising at least one stationary stop, said movable stop and said stationary stop being arranged to be moved into interfering relation with each other when said third rotatable gear moves axially away from said second rotatable gear.

4,930,612

ROLLER TRACK ASSEMBLY INCORPORATING A MECHANICAL ELEVATOR MECHANISM

Robert J. Thorndyke, Oshawa, Canada, assignor to Atlantis Transportation Services Inc., Oshawa, Canada

Filed Nov. 22, 1988, Ser. No. 274,961
Int. Cl.[5] B65G *13/00*
U.S. Cl. 193—35 SS **1 Claim**

1. A self-contained elevating roller track assembly comprising:

(a) a base member having first and second ends, a longitudinally elongated channel formed in said base member, said channel having a bottom wall, a pair of oppositely disposed side walls and an open upper end, a passage opening through said bottom wall,

(b) a lift bar located in said channel and slidably mounted on said bottom wall for longitudinal movement relative to the base member, a mounting bracket attached to the lift bar and extending through the passage formed in the bottom wall of the base member,

(c) first elevator ramp means on said lift bar, said first ramp means having a first ramp face which is inclined upwardly toward the first end of the base member,

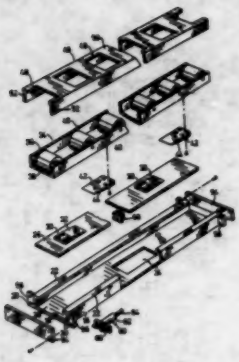
(d) a roller support member slidably mounted in said channel for longitudinal movement therein, said roller support member having a bottom wall overlying said lift bar,

(e) a plurality of load supporting rollers mounted for rotation on and extending upwardly from said roller support member,

(f) second elevator ramp means on said bottom wall of said roller support, said second elevator ramp means having a

second ramp face which extends parallel to said first ramp face in a face-to-face relationship therewith,

(g) drive means for driving the lift bar to and fro with respect to the base member to cause said first and second ramp faces to slide over one another to raise or lower the roller support member and its associated rollers as required in use said drive means comprising an extensible ram which has first and second ends, said ram being extensible to move the second end with respect to the first end, the extensible ram being located below the base member, the first end of said ram being mounted on said base member and said second end being mounted on said mounting bracket of said lift bar.

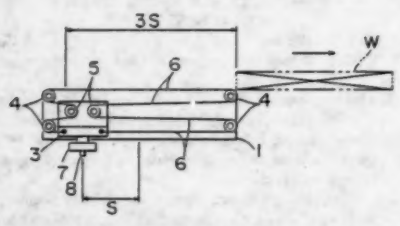


4,930,613

TRANSFERRING APPARATUS

Norio Okura; Ryoichi Okura, and Tugio Yonetani, all of Hyogo, Japan, assignors to Okura Tysoki Kabushiki Kaisha, Hyogo, Japan

Filed Sep. 26, 1988, Ser. No. 248,638
Claims priority, application Japan, Mar. 24, 1988, 63-70433
Int. Cl.[5] B65G *37/00*
U.S. Cl. 198—365 **3 Claims**



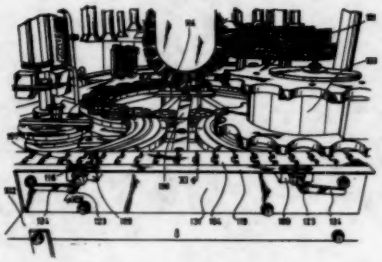
1. A transferring apparatus comprising: a carrier (1) movable in a direction along a transferring passage (2) that has an actuating means (9) disposed therein, said carrier having an upper portion and spaced apart sides; a moving frame (3) disposed on said carrier for movement in both directions across the moving direction of said carrier; said frame having a lower portion and an engagement member (7, 8), at least two or more belt supporting members (4, 75) arranged at each of said sides of said carrier; as many inner rollers (5) as the total number of the belt supporting members minus two mounted on said moving frame in spaced corresponding relation to said belt supporting members, a conveyor belt (6) having two end portions, an intermediate portion, and driving directions which are across said moving direction of the carrier with said intermediate portion being arranged on said upper portion of said carrier, said two end portions being trained around respective ones of said belt supporting members at said carrier sides, to run alternately in a folded-back manner between said belt supporting members and to said corresponding inner rollers spaced from said belt supporting members and then secured on said moving frame, so that said conveyor belt is driven by moving said moving frame sideways by the engagement of said engagement member on said lower portion of the moving frame with said actuating means disposed in transferring passage.

4,930,614

RECEPTACLE HANDLING MACHINE

Hermann Kronseder, P.O. Box 1230, 8402 Neutraubling, Fed. Rep. of Germany

Division of Ser. No. 161,172, Feb. 24, 1988, Pat. No. 4,880,098. This application Jul. 31, 1989, Ser. No. 387,596
Claims priority, application Fed. Rep. of Germany, Feb. 12, 1987, 8710999[U]; Feb. 26, 1987, 8702940[U]
Int. Cl.[5] B65G *47/00*
U.S. Cl. 198—346.2 **14 Claims**



1. A receptacle handling machine for the handling of receptacles which are passed through the machine comprising:

a machine frame (102) including a transverse extent, a longitudinal extent, a top side, an exterior side, a center portion, a preset position, an insertion rail (106) and at least one second insertion and stop element (107) defining a second transverse stop means, and a second longitudinal stop means set at predetermined distances from said preset position;

at least one receptacle guiding body (105) adapted to be moved in a direction of insertion to said preset position and clamped on said machine frame or unclamped and removed from said machine frame, said guiding body including a bottom side (111), a guiding means (110) on said bottom side for sliding movement on said rail, at least one first insertion and centering element (108) having a first transverse stop means and a first longitudinal stop means set at said predetermined distances when said guiding body is at said preset position;

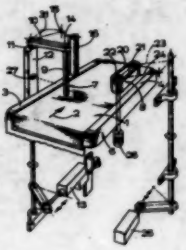
said guiding body (105), when inserted on said frame, having each of said first transverse and longitudinal stop means in contact with said second transverse and longitudinal stop means to precisely position said guiding body in said preset position; and

a releasable clamping member (109) mounted between said guiding body and said machine frame for clamping and holding said guiding body first transverse and longitudinal stop means against both of said machine frame second transverse and longitudinal stop means to prevent transverse and longitudinal play therebetween.

4,930,615
BUNDLE TURNING UNITS FOR USE WITH CONVEYORS

Kenneth M. Nash, Buckinghamshire, England, assignor to Packseal Industries Limited, Maidenhead, England

Filed Mar. 15, 1989, Ser. No. 324,250
Claims priority, application United Kingdom, Mar. 16, 1988, 8806213
Int. Cl.[5] B65G 47/24
U.S. Cl. 198—411 **10 Claims**

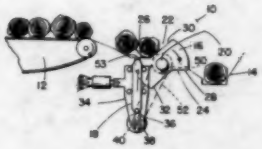


1. A bundle turning unit for use with conveyors of the type for conveying bundles for movement in a feed direction, said turning unit comprising a turnpost, mounting means mounting said turnpost in a generally vertical attitude with respect to said movement of a bundle is adapted to co-operate such that in combination with the continuous movement of said conveyor said bundle is adapted to be turned in a turning cycle through substantially 90° with respect to the plane of said conveyor, wherein power-operated means are provided for moving said turnpost at a controlled rate through an arc lying in a plane parallel to the plane of said conveyor in synchronism with said feed movement of said bundle, said turnpost being movable by said power-operated means in at least a first direction between an advanced position in which said turnpost overlies said conveyor by a predetermined maximum distance and a retracted position spaced from said advanced position.

4,930,616
ROTARY LOG SINGULATOR

Verne L. Lindberg, Everett, Wash., assignor to Industrial Machine Development Manufacturing, Inc., Everett, Wash.

Filed Aug. 19, 1988, Ser. No. 235,240
Int. Cl.[5] B65G 37/00
U.S. Cl. 198—463.6 **2 Claims**



1. Apparatus for singulating logs between an infeed and outfeed station comprising:

a. at least two longitudinally displaced rotating drums, said drums having at least one perimeter portion defined by a first and second chord stretch, said first and second chord stretch joining at an outwardly facing obtuse angle, said rotating drums being connected to a first shaft with the longitudinal axis of said first shaft parallel to the longitudinal axis of the logs to be singulated, said rotating drums located adjacent the outfeed station;

b. bar means having a separating surface and connected to a second shaft, whereby rotation of said second shaft produces vertical translational movement of said bar means, said second shaft having a longitudinal axis parallel to the longitudinal axis of said first shaft and the logs to be singulated, said bar means operatively associated with said rotating drum such that when said first chord stretch is transverse to said bar means, said bar means is at a first lower position below said first and second chord stretch allowing a log to rest on said first and second chord stretch and as said rotating drums continue to rotate in the same direction, said bar means moves vertically to a second upper position whereby a log resting on said first and second chord stretch advances toward the outfeed station if the center of the log is downstream of the separating surface of said bar means and logs not resting on said first and second chord stretch of said rotating drum are prevented from contacting said rotating drum;

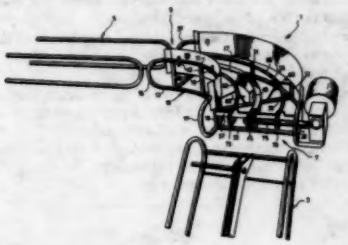
c. transmission means connected to said first and second shafts whereby rotation of said first shaft produces rotation of said second shaft and consequently vertical translational movement of said bar means; and

d. adjusting means connected to said bar means whereby said bar means may be adjusted horizontally to accommodate a range of log diameter sizes.

4,930,617
CURVED CONVEYOR

Michel Lavoie, and Gaétan Gendron, both of St. Césaire, Canada, assignors to Machinerie Ideale Cie Ltee, St. Césaire, Canada

Filed Aug. 22, 1989, Ser. No. 396,670
Int. Cl.[5] B65G 17/46
U.S. Cl. 198—692 **15 Claims**



1. A conveyor for transporting bales of hay or the like material, said conveyor extending along a curve and comprising:

a frame having a bale-receiving end and a bale-discharging end;

and endless chain having an upper and a lower strand, said chain extending between said frame ends and following said curve;

chain-carrying means mounted on said frame between said frame ends and including a plastic chain support for carrying said chain during displacement thereof; said support defining a pair of parallel grooves extending longitudinally between said frame ends, each groove having an opening on the side of said support facing away from the center of said curve; said grooves being configured and spaced from one another for slidably supporting said chain strands between said frame ends; said chain strands being fitted into said grooves and protruding partly out through said opening, and

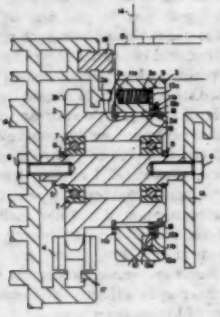
bale-driving spikes fixed perpendicularly to said chain, outwardly of said grooves.

4,930,618

POWER FREE TRIPLE CONVEYOR

Jae Y. Roh, 493, Shinpwong-dong, Saha-ku, Pusan-si, Rep. of Korea

Filed Dec. 27, 1988, Ser. No. 290,255
Int. Cl.[5] B65G 13/06
U.S. Cl. 198—781 4 Claims



1. A roller assembly for a power free triple conveyor for transporting a pallet in a transport direction including a frame, a shaft which is fixed to the frame, a rotatable sprocket mounted on the shaft through a bearing and having first and second end portions, and a chain engaged with said sprocket at said first end portion, said chain rotating in the form of an endless track for rotating said sprocket, said roller assembly further comprising:

a roller mounted behind a stepped portion of the sprocket at said second end portion by means of a pair of rings, a pair of friction plates, a bushing located between an inner surface of the roller and an outer surface of said second end portion of the sprocket,

a spring resiliently installed within a spring hole of the roller, one end of said spring bearing against one of said friction plates,

a snap ring fitted in the groove of the sprocket, said snap ring exerting a compressive force upon the other of said friction plates to protect against loosening,

a guide rail fixed at an upper portion of the frame, said guide rail for preventing the pallet from deviating from the pallet's transport direction.

4,930,619

APPARATUS FOR THE AUTOMATIC REPLACEMENT OF CONTAINER-RECEIVING PLATES OF A CONTAINER-FILLING MACHINE

Georg Fischer, Velbert, and Wilhelm Propper, Langenfeld, both of Fed. Rep. of Germany, assignors to Benz & Hilgers GmbH, Duesseldorf, Fed. Rep. of Germany

Filed Dec. 19, 1988, Ser. No. 286,559
Claims priority, application Fed. Rep. of Germany, Dec. 19, 1987, 3743278
Int. Cl.[5] B65G 17/38
U.S. Cl. 198—803.2 8 Claims

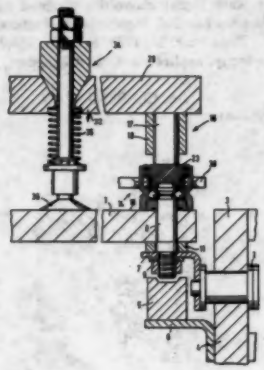
1. In a container-filling machine, an apparatus which comprises in combination:

a conveyor;

a plurality of cell plates carried by said conveyor and each formed with at least one receiver for respective container to be filled;

a manipulator provided with a gripper plate, and means on said gripper plate engageable with a cell plate to be replaced for removing the respective cell plate from said conveyor and applying a replacement cell plate to said conveyor; and

a locking and unlocking mechanism, free from screwthread rotation, including a pin securing each of said cell plates to said conveyor, an axial actuatable coupling member engageable with said pin, and a pressing element on said gripper plate positioned to axially actuate said coupling member.

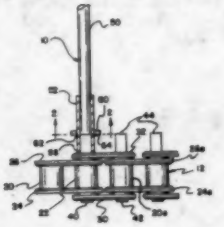


4,930,620

ARTICLE CARRYING MEMBER FOR CONVEYOR CHAIN

Charles G. Springman, Beech Grove, Ind., assignor to AMSTED Industries, Incorporated, Chicago, Ill.

Filed May 10, 1989, Ser. No. 349,816
Int. Cl.[5] B65G 17/12
U.S. Cl. 198—803.01 11 Claims



1. An article carrying member for mounting to a link pin end protruding from a roller type conveyor, said member comprising:

a rod;

a fracturable split sleeve telescoped upon an end of said rod with a portion of said sleeve extending beyond said rod to receive said link pin end;

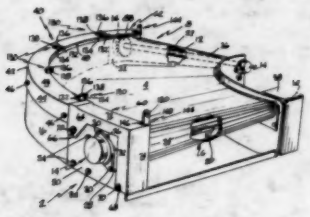
and a single washer encircling said split sleeve adjacent said rod end to compress said sleeve on both said rod and said pin and not open and separate therefrom except by fracture of said sleeve.

4,930,621

ATTACHMENTS FOR POWER TURNS

Robert D. Brown; Russell J. Hogsett, both of Canon City; Richard A. Compton, Pueblo, and Thomas W. Swisher, Canon City, all of Colo., assignors to Portec, Inc., Oak Brook, Ill.

Filed Sep. 16, 1988, Ser. No. 245,117
Int. Cl.[5] B65G 15/02
U.S. Cl. 198—831 20 Claims



1. An attachment for a power turn comprising:

a power turn having a frame having at least two opposite side wall portions comprising an arcuate outer side wall portion and an arcuate inner side wall portion;

a driving roll having one end portion rotatably mounted on said arcuate outer side wall portion and another end portion rotatably mounted on said arcuate inner side wall portion, said driving roll having a conically shaped outer surface and having a longitudinally extending axis of rotation;

driving means for rotating said driving roll;

an idler roll having one end portion rotatably mounted on said arcuate outer side wall portion and another end portion rotatably mounted on said arcuate inner side wall portion, said idler roll having a conically shaped outer surface and having a longitudinally extending axis of rotation;

an endless belt journaled for movement around said driving roll and said idler roll and moved by said driving roll;

said endless belt when journaled around said driving and idler rolls having an outer radius, an inner radius and opposite end surfaces;

cover means for covering at least the outer portion of said endless belt next adjacent to said outer radius;

said cover means comprising a main body portion comprising an arcuate side wall portion adapted to be secured to said arcuate other side wall portion of said frame and an integral top wall portion extending radially inwardly from said side wall portion and overlying said outer portion of said endless belt;

said main body portion having an arcuate extent less than the arcuate extent of said arcuate outer side wall portion so that at least said driving roll is not covered by said cover means;

at least one readily removable end portion for said cover means; and

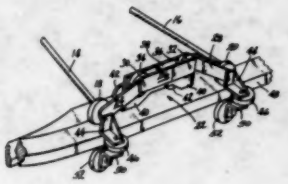
said at least one readily removable end portion having an arcuate side wall adapted to be secured to said arcuate outer side wall portion, an integral top wall extending radially inwardly from said arcuate side wall and overlying at least a portion of said driving roll and an integral end wall extending radially inwardly from said arcuate side wall and downwardly extending from said top wall and covering at least a portion of one of said end surfaces of said endless belt.

4,930,622

CURVED ESCALATOR WITH FIXED CENTER CONSTANT RADIUS PATH OF TRAVEL

Frank M. Sansevero, West Hartford, Conn., assignor to Otis Elevator Company, Farmington, Conn.

Filed Mar. 27, 1989, Ser. No. 328,926
Int. Cl.[5] B66B 21/02
U.S. Cl. 198—328 11 Claims



1. An escalator assembly having an arcuate path of travel defined by a constant radius derived from a fixed center as viewed in plan, the escalator including horizontal entry and exit landing zones, an intermediate constant slope zone, and entry and exit transition zones of constantly varying slope interconnecting the constant slope zone with the entry and exit landing zones respectively, said escalator assembly including:

(a) a plurality of steps, each having a step axle at radially inner and outer sides of the steps; and radially inner and outer step axle rollers rotatably mounted on said step axles;

(b) radially inner and outer step chains forming a flexible continuous connection between said step axles, said step chains controlling the distance between the step axles on adjacent steps;

(c) radially inner and outer tracks providing support for said step axle rollers along the path of travel of the escalator, the outer of said tracks having a first portion thereof comprising vertically offset branches providing two different lines of travel on said outer track when viewed in elevation, one line of which is traversed by said outer step axle rollers and said track branches converging toward each other at said entry transition zone and diverging away from each other at said exit transition zone whereby the angular velocity of the steps changes in said transition zones; and

(d) additional rollers on said outer step chain positioned to traverse the other of said two different lines of travel, said additional rollers being operable, when on said other line of travel to change the effective length of said outer chain thereby changing the distance between adjacent step axles so that the steps are properly positioned on the track and on said arcuate path of travel of the escalator.

4,930,623

CONVEYOR SYSTEM AND INTEGRAL ONE-PIECE EXTENDED GUIDETRACK

Thomas A. Johnson, Germantown, Tenn., and Larry V. McDonald, Blytheville, Ark., assignors to Industrial Conveyor Co., Inc., Memphis, Tenn.

Filed Jun. 19, 1989, Ser. No. 367,951
Int. Cl.[5] B65G 37/00
U.S. Cl. 198—465.1 27 Claims

1. An integral one-piece extended guide track for supporting an endless conveyor means having first and second runs, including:

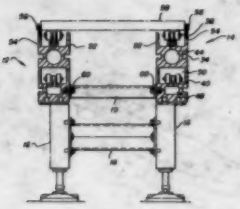
(a) first and second web sections having left and right sides, top and bottom;

(b) said first web section including an upwardly extending open channel for slidably supporting the first run of the conveyor means;

(c) said second web section positioned below said first web section and connected thereto;

(d) said first and second web sections each including a full length horizontally extending separately enclosed passageway parallel to said channel;

(e) said first and second web sections forming therebetween a full length central separately enclosed guideway parallel to said passageway and said channel;



(f) said central guideway having means for supporting the second run of the conveyor means; and

(g) said first and second web sections each including mounting means extending the length of the guide track.

4,930,624

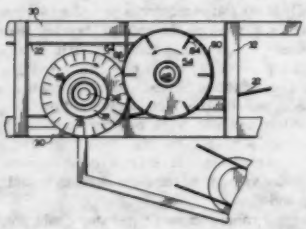
CONVEYOR BELT DRIVE SYSTEM

Hendrikus J. Geverink, RR#2 (17th Avenue), Markham, Ontario, Canada (L3P 3J3), and Leonardus W. Assinck, 132 Manitoba Street, Stouffville, Ontario, Canada (L4A 7Z8)

Filed Jun. 15, 1989, Ser. No. 366,423

Int. Cl.[5] B65G *23/04*

U.S. Cl. 198—835 **19 Claims**



1. In a conveyor system comprising a flexible continuous conveyor belt having a face surface and a back surface, and in which:

the belt is driven in a continuous loop by juxtapositioned first and second drive pulley engaging the belt,

the first pulley means rotating in a direction opposite to the direction of rotation of the second pulley means,

the belt passing about the first drive pulley means with the back surface in engagement therewith, then passing about the second pulley means with the face surface in engagement therewith,

first drive wheel means coupled to the first drive pulley means for rotation therewith and having peripheral outer first engagement surfaces,

second drive wheel means coupled to the second drive pulley means for rotation therewith and having peripheral outer second engagement surfaces,

means to rotate one of the first and second drive pulley means, and

the first and second drive wheel means coupled for rotation together by the first engagement surfaces frictionally engaging the second engagement surfaces,

the improvement wherein:

one of the first and second engagement surfaces comprising a resilient, deformable surface and the other of the first and second engagement surfaces comprising a rigid nondeformable surface, and

the first and second engagement surfaces permit minor slippage therebetween to compensate for differences in peripheral velocities of the first and second engagement surfaces.

4,930,625

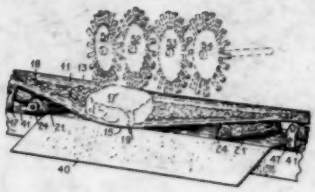
CONVEYOR BELT DUMPING MECHANISM USING HORIZONTAL IDLERS OF VARYING LENGTHS

William A. Wilson, 83 Pheasant Dr., Marietta, Ga. 30067

Filed Jul. 6, 1989, Ser. No. 375,938

Int. Cl.[5] B65G *15/60*

U.S. Cl. 198—839 **6 Claims**



1. An apparatus for partially supporting a conveyor belt comprising: a plurality of idlers, each of which is rotatably mounted in a horizontal position; at least two of the idlers being approximately equal in length to the width of the belt; the idlers being disposed approximately parallel to each other; idlers which are substantially shorter than said two idlers being disposed between them, each of the shorter idlers being offset with respect to the centerline of the belt and to the same side of the belt, the end of each of the shorter idlers which is closest to the centerline lying along an imaginary concave arc which opens towards one edge of the belt, thereby forming a soft spot in a portion of the belt passing to one side of the shorter idlers.

4,930,626

CARTRIDGE BOX

Jack L. Miller, 535 Pacific Ave., Alameda, Calif. 94501

Filed May 3, 1989, Ser. No. 347,491

Int. Cl.[5] B65D *43/12, 85/20*

U.S. Cl. 206—3 **2 Claims**

1. A cartridge box comprising

(a) a casing having two side walls with a longitudinally extending groove on the inner surface of each side wall, the bottom wall of the casing having an upwardly inclined front end portion;

(b) a cartridge carrier slidably mounted in the grooves in the side walls and having a plurality of rows of cartridge-receiving openings, the axes of these openings being inclined with respect to the plane of the upper surface of the carrier so that the rims of the cartridges mounted in the openings will have their planes inclined to that of the carrier upper surface;

(c) a flexible cover slidable in two other longitudinally extending grooves in the casing side walls, these last two grooves being spaced above said first mentioned grooves and having their front portions inclined downwardly at an angle so that when the cover is closed, the front edge thereof will contact the carrier and enclose the cartridges in said carrier, the closed cover contacting the cartridge

rims and holding the opposite ends of the cartridges in contact with the bottom casing wall for preventing the cartridges from rattling; and

(d) said cover being slidably into partially open position for exposing the first row of cartridges and said carrier being movable for causing this first row of cartridges to have their lower ends ride upwardly on the inclined portion of the bottom wall for lifting the cartridge rims in the first row above the carrier upper surface where they may be manually removed.

4,930,627

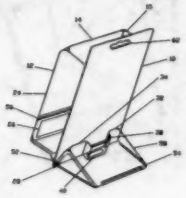
RECLOSABLE BLISTER CARD DISPLAY PACKAGE

Rodney D. Borst, Oregon, and Scott M. Niesen, Madison, both of Wis., assignors to Placon Corporation, Madison, Wis.

Filed Sep. 11, 1989, Ser. No. 406,137

Int. Cl.[5] B65D *43/16*

U.S. Cl. 206—45.23 **15 Claims**



1. A thermoformed blister of flexible plastic material for a reclosable blister card display package comprising:

(a) a bubble body, the body having an article compartment, and top, left, right and bottom peripheral flanges for sealing to a backing card to close the article compartment, a body front face, and portions defining an egress opening in the front face;

(b) a cover integral with the body and connected to a flange of the body by an integral hinge, the cover being pivotable about the integral hinge between a first position in which the cover fully closes the egress opening in the front face and a second position in which the egress opening is fully revealed for unimpeded access thereto, and the cover having portions defining an opening through which a heat sealing tool may contact the connected flange when the cover is in its first closed position to heat seal the connected flange to a backing card; and

(c) means formed in the body front face and the cover for releaseably fastening the cover to the front face in the cover first position.

11. A thermoformed blister of flexible plastic material for a reclosable blister card display package comprising:

(a) a bubble body, the body having an article compartment, and top, left, right and bottom peripheral flanges for sealing to a backing card to close the article compartment, a body front face, and portions defining an egress opening in the front face;

(b) a cover independent of the body and connected to a flange of the body by an integral hinge, the cover being pivotable about the integral hinge between a first position in which the cover overlies a portion of the body and fully closes the egress opening in the front face and a second position in which the egress opening is fully revealed for unimpeded access thereto;

(c) a wedge-shaped projection on the cover;

(d) portions defining a wedge-shaped depression on the body above the egress opening, the depression being suited to receiving the projection, and the projection and the depression cooperating to hold the cover in a position fully blocking the egress opening; and

(e) a front face on the cover, the body front face and the cover front face being in substantially the same plane and adapted to receiving a continuous adhesive label when the cover is in its first closed position.

13. The reclosable package blister of claim **11** wherein the cover has two feet, the feet being adapted to support the package in a free-standing posture when the cover is in a first closed position.

4,930,628

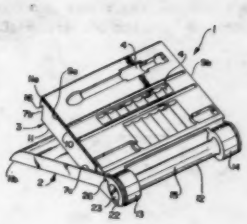
STORAGE AND DISPLAY CASE HAVING PIVOTALLY MOUNTED COVER

John A. Bridges, Nashville, Tenn., assignor to Aladdin Industries Inc., Nashville, Tenn.

Filed Nov. 21, 1988, Ser. No. 273,563

Int. Cl.[5] B65D *5/52, 85/20, 25/24*

U.S. Cl. 206—45.23 **43 Claims**



1. A case comprising:

a base having at least one recess adapted to hold an object, said base including a bottom surface and a top surface, the top surface and the bottom surface being surrounded by two opposing lateral ends and two opposing sides, at least one of the two opposing sides being angled outwardly from the bottom surface towards the top surface forming a rear angled side, and the other of the two opposing sides is a front side and includes a hook portion that extends along at least a portion of its length;

a cover pivotally mounted on the base so as to rotate on an axis that is substantially parallel to the rear angled side, the cover being adapted to pivot between a closed position wherein the base is covered and an open position wherein the cover abuts the rear angled side;

whereby when the cover is in an open position, with the cover abutting the rear angled side, the case is supported on the cover with the base being at an angled to the horizontal that permits easy access to any objects contained therein.

4,930,629

CARRIER CARTON WITH SELECTIVELY POSITIONABLE SEPARATORS

James C. Petty, Mishawaka, Ind., assignor to Indiana Carton Corp., Bremen, Ind.

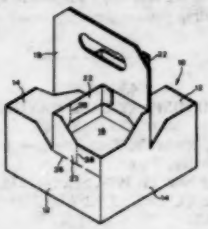
Filed Oct. 18, 1989, Ser. No. 423,027

Int. Cl.[5] B65D *75/00*

U.S. Cl. 206—185 **5 Claims**

1. A carrier carton having a flattened collapsed form and an expanded box like form, said box-like form comprising parallel side panels and adjoining parallel end panels, a bottom, a center panel extending between said end panels to separate the interior of said box-like form into a compartment between the center panel each side panel, and a selectively positionable separator extending in a first position from said center panel to at least one of said side panels between said end panels to further divide such compartment formed between the center panel and one side panel into product carrying sections, said separator including an extension joined detachably to said one side panel, said separator having a second position extending

adjacently along said center panel with its said extension detached from said one side panel and positioned adjacent one of



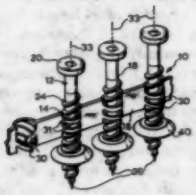
said end panels to more fully expose said compartment between the center panel and said one side panel.

4,930,630

SCREW STRIP WITH WASHERS

Gordon L. Habermehl, #1 Tall Pine Road, Port Sydney, Ontario, Canada P0B 1L0

Filed Sep. 29, 1989, Ser. No. 414,514
Claims priority, application Canada, Jun. 15, 1989, 602955
Int. Cl.[5] B65D *73/00*
U.S. Cl. 206—347 **11 Claims**



1. A plastic holding strip for holding a plurality of screws carrying washers in a row,

the strip comprising spaced parallel sleeves interconnected by lands with one of the screws received in each sleeve,

each screw having a head at one end, a tip at the other end and a threaded shank extending from below the head to the tip,

each screw received in each sleeve with the screw's head extending from one end of the sleeve and the screw's tip extending from the other end of the sleeve,

a washer engaged about the shank of each screw between the sleeve receiving that screw and the screw's tip,

the sleeve threadably engaging the threaded shank,

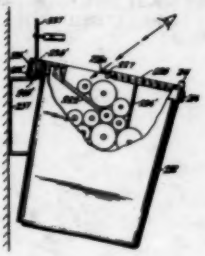
the sleeve having a reduced strength portion between the lands such that a screw on being threaded tip first into a workpiece is automatically separated from its sleeve carrying the washer while simultaneously maintaining the length of the strip substantially intact and while guiding the screw by threaded engagement of the screw in its respective sleeve.

4,930,631

RECEPTACLE FOR STORAGE AND DISPOSAL OF POTENTIALLY INJURIOUS IMPLEMENTS SUCH AS USED SCALPEL BLADES, HYPODERMIC NEEDLES AND THE LIKE

John Bruno, 77-83 Second Ave., Paterson, N.J. 07514

Continuation of Ser. No. 344,466, Apr. 27, 1989, abandoned, which is a continuation of Ser. No. 256,186, Oct. 6, 1988, abandoned, which is a continuation-in-part of Ser. No. 833,335, Feb. 25, 1986, abandoned, which is a continuation-in-part of Ser. No. 826,288, Feb. 5, 1986, abandoned. This application Sep. 12, 1989, Ser. No. 406,869
Int. Cl.[5] B65D *83/10*
U.S. Cl. 206—366 **40 Claims**



1. A self-contained receptacle for safely storing potentially dangerous implements such as hypodermic needles, scalpel blades and the like, comprising:

a containment member proportioned to retain a plurality of implements; and

a top member adapted to be attached to said containment member,

said top member including an opening proportioned to receive a desired size of implements, a guide member extending generally angularly downwardly into said receptacle from said top member generally along one edge of said opening and a back-drop/stop member extending downwardly from said top member adjacent the side of said opening opposite the side adjacent to which said guide member is mounted, said back-drop/stop and guide members having distal edges which form a slot-like gap for allowing implements to drop into said receptacle, said back-drop/stop member and said guide member being positioned and proportioned relative to each other to cause at least a momentary slowing of travel of implements along said guide member to ensure that each implement assumes a generally horizontal orientation before actually dropping into said containment member such that implements inserted through said opening are aligned in a generally horizontal orientation by cooperation between said guide and back-drop/stop members at said slot-like gap, thereafter to drop into said containment member for side-by-side stacking with other implements deposited therein.

4,930,632

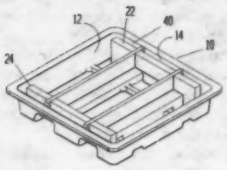
HAZARDOUS LIQUID CONTAINMENT TRAY

Robert L. Eckert, 11231 Foster Road, Los Alamitos, Calif. 90720; Don C. Atkins, 11282 Foster Road, Los Alamitos, Calif. 90720, and Lee Sechler, 15111 Bushard #45, Westminister, Calif. 92683

Filed Dec. 5, 1988, Ser. No. 279,876
Int. Cl.[5] B65D *85/62, 21/02, 19/26*
U.S. Cl. 206—386 **10 Claims**

1. A hazardous liquid containment structure comprising the combination of:

a. a tray having:
(1) a base;
(2) substantially vertical side walls entirely surrounding the base to form a containment pan with their upper edges lying in a common plane;
(3) a pair of parallel, transverse grooves formed by indentations molded in the bottom wall of said base, spaced apart a sufficient distance and of a sufficient width to receive therein the fork members of a fork lift; and



(4) a plurality of reinforcement ribs transverse to said grooves; and
b. a pallet support member resting within said tray and comprising:
(1) at least a pair of spaced-apart beam members having a vertical height at least equal to the height of said vertical walls; and
(2) a plurality of transverse rails supported by and attached to said beam members, thereby forming a platform to support a storage pallet above said plane.

4,930,633

MULTIPLE PACK FOR A PLURALITY OF CYLINDRICAL CONTAINERS

Wolfgang Glöyer, Wiesenweg 51, D-2000 Oststeinbek, Fed. Rep. of Germany

Continuation of Ser. No. 777,984, Sep. 12, 1985. This application Sep. 22, 1987, Ser. No. 102,820

Claims priority, application Fed. Rep. of Germany, Jan. 20, 1984, 3401884; Oct. 20, 1984, 8430925

Int. Cl.[5] B65D *61/00*

U.S. Cl. 206—428 **8 Claims**

1. A multiple container package comprising:
a plurality of cylindrical rigid containers of uniform design, shape and size, each container having a substantially planar bottom surface;
a support envelope for said containers formed of a substantially rectangular cardboard blank in the form of a longitudinal strip having two transverse folding lines positioned to define a planar base surface, upon which the containers are arranged in juxtaposed upright manner in a plurality of parallel rows arranged parallel to said transverse folding lines with the planar base surface lying below the bottom surfaces of the containers, the planar base surface having therein at least one U-shaped cut with an associated longitudinally directed fold line to define at least one elongated flap, each said flap folded up by 90° to position one such flap between two adjacent containers in each row, thereby preventing transverse sliding of the containers in said parallel rows and stiffening the base surface; and two side or end wall surfaces connected by the transverse folding lines to the base surface and folded upwardly to define the cardboard support envelope with two opposite ends or sides of the containers uncovered, the height of the upwardly folded side or end wall surfaces being the same as or less than the height of the containers so that the tops of the containers are uncovered, the transverse length of both the base surface and the upwardly folded side or end wall surfaces being less than the sum of the diameters of the containers in at least one of said rows of containers so that the uncovered surfaces of the containers at the two ends of said at least one row extend partially beyond the planar base surface and upwardly folded end or side wall surfaces; and
a surrounding band member held under tension and extending across the containers at the uncovered ends or sides of the container package and along the upwardly folded side or end wall surfaces of the package at approximately the mid-point of the height of the containers, the band holding the containers within the package and being usable as the sole means for holding the package together and for one or two-handed carrying of the package.

4,930,634

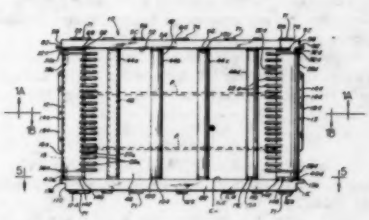
CARRIER FOR FLAT PANEL DISPLAYS

Randall S. Williams; Michael D. Peterson, both of Chaska, and Robert J. Neutl, Lakeville, all of Minn., assignors to Fluoroware, Inc., Chaska, Minn.

Continuation-in-part of Ser. No. 102,166, Sep. 29, 1987, Pat. No. 4,815,601. This application Mar. 13, 1989, Ser. No. 322,728

Int. Cl.[5] B65D *85/48*

U.S. Cl. 206—454 **33 Claims**



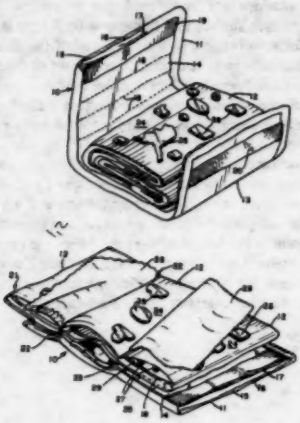
1. A strong and rigid carrier of substantial size for glass panels and the like being processed for use in panel displays, comprising:
a pair of end walls with peripheries thereabout of melt processible plastic in confronting and spaced relation to each other; and
two elongate sidewall segments of melt processible plastic extending between and to the end walls adjacent the peripheries thereof with glass panel supporting and spacing means extending inwardly and each segment having end portions extending to and affixed to both end walls with portions of the segments extending tranversely and obliquely of the adjacent periphery thereby adding strength and rigidity to the carrier and minimizing bending, bowing, twisting, warping and other distortions of the carrier during processing of the glass panels.

4,930,635

JEWELRY DISPLAY BOOK

Calvin J. Hotchkiss, and Nancy E. Hotchkiss, both of Anchorage, Ak., assignors to Pac-Rim Trading Company, Inc., Anchorage, Ak.

Filed May 10, 1988, Ser. No. 192,331
Int. Cl.[5] B65D 73/00
U.S. Cl. 206—495 9 Claims



1. A soft container for storing and displaying items of jewelry, which comprises:

a pliable, foldable cover element made from a first, durable material; and

a page-like section made from a second pliable material affixed along one side edge to said cover element and being arranged relative to the cover element to permit the folding of the cover element from the page-like section to contain the page-like section;

the page-like section being further arranged relative to the cover element to be rotatable about the one side edge;

the page-like section comprising a loop of the second pliable material having exterior jewelry display surfaces and inner mounting cap surfaces; and

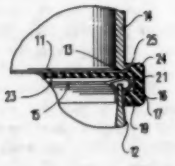
a protective layer affixed to the cover element and arranged to cover at least one exterior jewelry display surface when the cover element is folded about the page-like section.

4,930,636

STACKABLE CONTAINER ASSEMBLY

Marcia A. Meadows, 1520 Cumberland Ct. West, Palm Harbor, Fla. 34683

Filed Jul. 19, 1989, Ser. No. 381,816
Int. Cl.[5] B65D 21/02
U.S. Cl. 206—503 2 Claims



1. A stackable container assembly, comprising:

a pair of cylindrical containers;

each of said containers having top and bottom radially extending circular rims;

a connector for securing said containers in coaxial stacked relation;

said connector formed from a resilient material and having a planar circular partition, said partition forming a cover for a top opening of one of said containers;

first and second cylindrical side walls extending around a peripheral edge of said circular partition, said first and second cylindrical side walls extending in opposite axial directions and intersecting at said circular partition;

a first undercut circular groove formed on an interior surface of said first cylindrical side wall, said first grove dimensioned to frictionally engage said top rim of one of said containers;

a second undercut circular groove formed on an interior surface of said second cylindrical side wall, said second grove dimensioned to frictionally engage said bottom rim of one of said containers, whereby said containers may be retained in coaxial stacked relation;

said container bottom rims having a smaller diameter than said container top rims and said connector including a radially inwardly extending circular rib having an arcuate transverse cross sectional shape and disposed on said second cylindrical side wall, adjacent said first undercut circular groove;

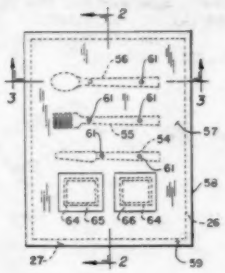
said first undercut groove having a greater depth than said second undercut groove such that disengagement of said container top rim from said first undercut groove requires a larger force than the disengagement of the container bottom rim from said second undercut groove, whereby said containers may be disassembled from stacked relation, without displacing said partition from said container top opening.

4,930,637

COMBINATION FOOD CONTAINER AND EATING UTENSIL

Robert F. DeRoseau, 4296 Lake Knolls, Oxford, Mich. 48051

Filed Aug. 16, 1988, Ser. No. 232,802
Int. Cl.[5] A45C 11/20
U.S. Cl. 206—541 5 Claims



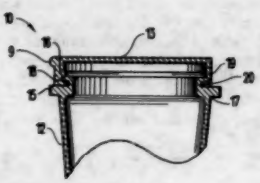
1. A combination food and utensil container for storing and partaking of food in a sanitary manner comprising in combination, a body which is adapted for preserving food, said body having a height which is substantially less than its length and breadth, a bottom wall and an upward extending side wall adjoining the periphery of said bottom wall; a detachable first cover in sealing relationship to said body fixed to the upper edge portion of said body side wall, said first cover having at least one pocket extending downwardly from the outer surface thereof which is adapted for storing a substance for enhancing the flavoring of said food; a second cover detachably bonded to the outer surface of the first said cover for enclosing said pocket; at least one eating utensil in the interior of said container, said utensil attached to the inner surface of said first cover; and a means for attaching said utensil to the inner surface of said first cover.

4,930,638

DENTURE BRUSH TRAVEL CASE

Rita L. Vasconcellos, 907 Sanford Road, Westport, Mass. 02790

Filed Sep. 11, 1989, Ser. No. 405,029
Int. Cl.[5] B65D 3/28, 85/00
U.S. Cl. 206—581 2 Claims



1. A denture brush travel case, comprising:
a front wall;
a back wall extending in spaced parallel relation with said front wall;
each of said front and back walls forming a parallelogram having parallel top and bottom edges connected by downwardly converging side edges;
said front and back walls connected by a pair of downwardly and inwardly converging rectangular side walls;
a square planar bottom wall extending between said front, back and side walls and forming an open topped hollow receptacle;
a removable cap for an open top portion of said receptacle;
a pair of prismatic compartments on said side walls for holding a cleaning agent;
each of said compartments including a dispensing neck disposed adjacent said bottom wall, and closed by a removable cover;
each of said compartments tapering from a smaller end adjacent said open top portion to a larger end adjacent said bottom wall; and
each of said compartments including a pair of elongated spaced parallel side walls connected by an elongated rectangular end wall.

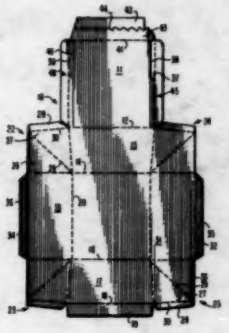
2. A denture brush travel case, comprising:
a front wall;
a back wall extending in spaced parallel relation with said front wall;
each of said front and back walls forming a parallelogram having parallel top and bottom edges connected by downwardly converging side edges;
said front and back walls connected by a pair of downwardly and inwardly converging rectangular side walls;
a square planar bottom wall extending between said front, back and side walls and forming an open topped hollow receptacle;
a removable cap for an open top portion of said receptacle;
said cap connected to said back wall by a hinge;
said hinge formed by a flexible plastic strip;
a radially outwardly extending rectangular peripheral flange formed around a top portion of said receptacle;
a reduced rectangular neck portion extending upwardly above said peripheral flange and including an outwardly extending sealing flange;
a pair of axially spaced internal ribs in said cap, said ribs forming a sealing groove dimensioned for engagement with said sealing flange, with one of said ribs in abutment with said peripheral flange and forming an outer seal;
a pair of prismatic compartments on said side walls for holding a cleaning agent;
each of said compartments including a dispensing neck disposed adjacent said bottom wall, and closed by a removable cover; and
each of said compartments including a pair of elongated spaced parallel side walls connected by an elongated rectangular end wall.

4,930,639

OVENABLE FOOD CONTAINER WITH REMOVABLE LID

William R. Rigby, Newark, Del., assignor to Westvaco Corporation, New York, N.Y.

Filed Aug. 2, 1989, Ser. No. 884,770
Int. Cl.[5] B65D 5/54
U.S. Cl. 206—621 7 Claims



1. A container for packaging, storing and cooking food consisting of an integral lid and tray comprising:
(a) a base panel:
(b) a plurality of upstanding tray walls foldably attached to said base panel along opposed score lines comprising at least two opposed side walls, a front wall and a rear wall;
(c) gusset panel closures foldably connected between the ends of said tray walls, said gusset panels being overlappingly bonded together and to said side walls;
(d) flange extensions foldably attached to the upper edges of said opposed side walls and adapted to lie in a plane substantially parallel to the plane of said base panel:
(e) a lid panel integrally attached to said rear wall along the upper edge thereof said lid including side extensions adapted to overlap and be bonded to said side wall flange extensions when the container is closed;
(f) a front wall closure flap foldably attached to the leading edge of said lid panel and adapted to be overlappingly bonded to said front wall;
(g) means in said front wall closure flap for releasing the lid from the front wall: and,
(h) means in said lid panel for detachably removing said lid from said tray.

4,930,640

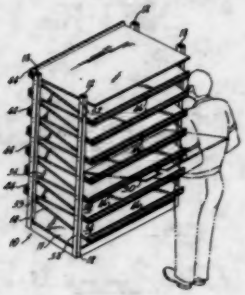
TWO-SIDED STORAGE SYSTEM

Walter H. Edwards, 13300 SW. 55th St., Fort Lauderdale, Fla. 33330

Filed Jun. 9, 1989, Ser. No. 363,927
Int. Cl.[5] A47F 5/00
U.S. Cl. 211—41 7 Claims

1. A two-sided storage system or bin comprising shelf support means and a plurality of flat, rigid shelves supported thereby in a zig-zag vertical arrangement relative to said shelf support means in such a manner that alternate of said shelves are located in alternate oblique planes extending transversely of said shelves at an acute angle in alternating opposite directions from the horizontal, said storage system or bin having a first longitudinal side and a second longitudinal side, each of said flat, rigid shelves having a first longitudinal side edge

extending along said first longitudinal side and a second longitudinal side edge extending along said second longitudinal side, the first longitudinal side edge of each alternate one of said shelves substantially abutting the first longitudinal side edge of one of said shelves vertically adjacent thereto to one side thereof to form a closed transverse side of a compartment along said first longitudinal side of said system or bin and vertically spaced from the first longitudinal side edge of another one of said vertically adjacent shelves to the other vertical side thereof to form a first access opening along said first longitudinal side to a compartment that converges transversely inward from said access opening, the second longitudinal side edge of said one alternate shelf substantially abutting the second longitudinal side edge of said other one of said vertically adjacent shelves to said other vertical side thereof to form a closed transverse side of another compartment along said second longitudinal side of said system or bin and vertically spaced from the second longitudinal side edge of said one of said vertically adjacent shelves to said one vertical side of said alternate one of said shelves to form a second access opening to a compartment, said second access opening extending along said second longitudinal edge of said system or bin, each vertically adjacent upper surface accessible along substantially the entire length of said shelf, adjacent of said shelves being accessible from alternate sides of said system or bin from the top shelf to the bottom shelf of said system or bin.



4,930,641

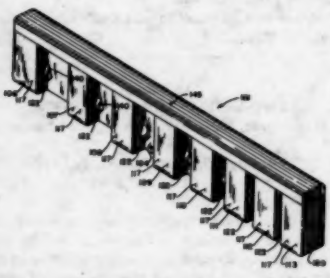
BLADED TOOL HOLDER

Jack F. Dale, 325 N. Main St., Mountain Grove, Mo. 65711

Filed Jul. 17, 1989, Ser. No. 380,388

Int. Cl.[5] A47F *7/00*

U.S. Cl. 211—70.6 **2 Claims**



1. A tool holder, particularly adapted to hold wood chisels, comprising a backing plate, a multiplicity of pairs of elongated blocks extending from said backing plate, blocks of successive pairs being spaced from one another a distance to accept chisels of different blade widths, said blocks having facing surfaces one of which has a sloping seat, opening toward the facing surface of the other, said seat sloping away from the said surface in a vertically upward direction at an angle of about 10 to 20 degrees, said seats being partly in said backing plate but having a center line forward of said backing plate, and a ball of a diameter to permit the ball to move freely in said seat but to project from said seat at the lower end of said seat, said seat extending more than 180 degrees around the ball at the lower end of said seat, and the diameter of the ball and the spacing of the blocks being such that the ball is spaced from the facing surface at the lowermost position of the ball, whereby, when a wood chisel is placed with its blade flat against said backing plate, the ball in the seat engages a narrow side edge of said chisel blade.

4,930,642

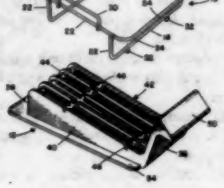
MERCHANDISE DISPLAY SYSTEM

Lynwood C. Brooks, 58 Indian Pipe, Painted Post, N.Y. 14870; Lloyd J. Fuller, 107 Central Ave., Elkland, Pa. 16920; Randolph J. Russo, 6 Wyndham Ct., Nanuet, N.Y. 10954, and Robert P. Russo, 1 Georgetown Oval, New City, N.Y. 10956

Filed Jan. 9, 1989, Ser. No. 295,099

Int. Cl.[5] A47F *7/00*

U.S. Cl. 211—71 **20 Claims**



1. A system for displaying first merchandise and second merchandise, said first merchandise having an outside surface having a first configuration and said second merchandise having an outside surface having a second configuration, said system comprising:

(a) a first frame member having a front, a back, and two sides, and including an opening for receiving the first merchandise, said opening having a configuration which corresponds to the first configuration so that the first merchandise when received in the opening is held in place:

(b) a second frame member having a front, a back, and two sides, and including an opening for receiving the second merchandise, said opening having a configuration which corresponds to the second configuration so that the second merchandise when received in the opening is held in place:

(c) a first base member for supporting the first merchandise, said first base member having a front and a back and being connected to the first frame member with the front of the first frame member being located in the region of the front of the first base member;

(d) a second base member for supporting the second merchandise, said second base member having a front and a back and being connected to said second frame member with the front of the second frame member being located in the region of the front of the second base member: and

(e) means for releasably connecting a side of the first frame member to a side of the second frame member to form a unit in which the first frame member is located next to the

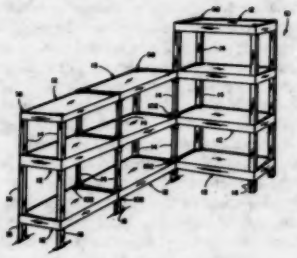
second frame member and the front of the first base member is in substantial transverse alignment with the front of the second base member.

4,930,643

DISPLAY UNIT WITH MODULAR CAPABILITY

Paul L. Flum, Ladue, Mo., assignor to Paul Flum Ideas, Inc., St. Louis, Mo.

Filed Nov. 2, 1987, Ser. No. 115,718
Int. Cl.[5] A47F 43/00
U.S. Cl. 211—188 24 Claims



1. A display unit for accommodating the storage of products thereon comprising a plurality of substantially similar shelf members, each of said shelf members having an upper portion, a lower portion, and a floor portion for positioning products thereon, a plurality of elongated support members having opposed end portions, a plurality of socket cavities associated with the upper portion of each of said shelf members and a plurality of socket cavities associated with the lower portion of each of said shelf members, said plurality of upper and lower socket cavities being positioned at spaced locations on the respective upper and lower portions of said shelf members, each of said socket cavities including side wall portions forming a locating surface for cooperatively positioning and locating the opposed end portions of said support members within each such socket cavity, each of said elongated support members including concavely biased resilient side wall portions, the concavely biased side wall portions of each of said support members being able to flex inwardly away from their normal unstressed biased condition so as to be receiveably engageable in a compression fit with the side wall portions of each of said upper and lower socket cavities, the side wall portions of said support members having sufficient elasticity to move outwardly back towards their normal unstressed concavely biased condition once positioned within said sockets cavities so as to frictionally wedge the side wall portions of said support members against the side wall portions of the respective socket cavities, said plurality of elongated support members being positioned between and engaged with the respective upper and lower socket cavities associated with adjacent shelf members to connect said adjacent shelf members in spaced apart relationship one above the other.

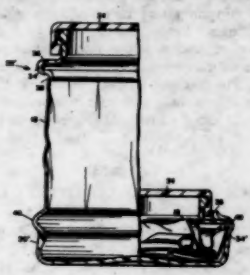
4,930,644

THIN FILM CONTAINER WITH REMOVABLE LID AND RELATED PROCESS

Edward S. Robbins, III, 459 North Ct., Florence, Ala. 35630

Filed Dec. 22, 1988, Ser. No. 288,237
Int. Cl.[5] B65D 23/00
U.S. Cl. 215—1 C 22 Claims

1. A reuseable and collapsible, one-piece blow-molded, stand-alone container having an upper open end provided with closure receiving means, a lower end, and a peripheral sidewall of predetermined axial length, the lower end being closed by an integral bottom wall, and wherein said peripheral sidewall has a substantially uniform cross-sectional area from said upper open end to said lower end and has a thickness in an upper, minor portion thereof of from about 0.020 to 0.030 inch, and a thickness in an intermediate, major portion of from about 0.002 to 0.003 inch, wherein said peripheral sidewall is self-supporting, but the major portion of which is collapsible to a relatively stable collapsed position upon exertion of an axial force applied at the upper or lower end thereof, such that, in said stable collapsed position, the major collapsed portion lies radially within the periphery of at least the lower end of the container.

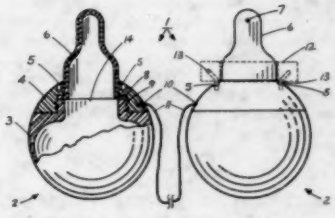


4,930,645

TETHERED PAIR LIQUID FEEDER/TOY SET

Norwood R. Warehime, 2021 Schuster Rd., Jarrettsville, Md. 21084

Filed Oct. 17, 1989, Ser. No. 422,745
Int. Cl.[5] A61J 9/00; B65D 23/12
U.S. Cl. 215—11.1 16 Claims



1. Tethered pair liquid feeder/toy set, normally for infant use, comprising:

a pair of containers, constructed for holding liquids, with each of said containers having general spherical form and a short outwardly projecting nozzle opening including threads on the outer wall side of said nozzle opening, with abutting shoulders on both sides of said nozzle opening threads, with said nozzle opening threads and said shoulders defining cooperating means to facilitate the placement of a rotatable nozzle ring with general segmented spherical shape and threads to mate with said each of said containers and with abutting shoulders on both sides of said nozzle ring threads, with said cooperating means also including mating of said shoulders of said nozzle opening and said nozzle ring to clamp and hold the matching flanges of interchangeable feeder/toy fixtures placed within the said nozzle opening of said nozzle ring, with said nozzle ring having means to permit rotation of said nozzle ring, with the general combination of said container and said nozzle ring having at least one means for receiving and making a tether line attachment;

a length of tether line suitable for linking said pair of containers;

two of a number of interchangeable feeder/toy fixtures including infant feeding nipples, container closure caps, and container closure cans with attached toys, with all of said fixtures having flanges and sizes suitable for attachment to and functional use on said containers in said nozzle opening;

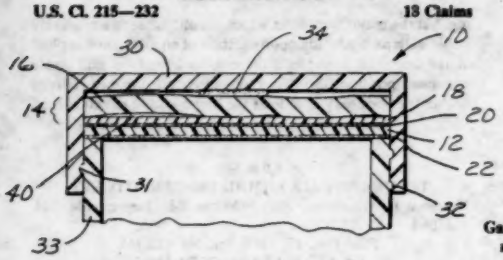
whereby two of said separate unit container assemblies as described above can be connected by said tether line, linked and held fixed to said attachment means of said general combination of said container and said nozzle ring, and thereby forming said tethered pair liquid feeder/toy set.

4,930,646

CAPLINER/INNERSEAL COMPOSITE UTILIZING COLD SEAL ADHESIVE

Jeffrey O. Emslander, Oakdale, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Feb. 1, 1989, Ser. No. 305,412
Int. Cl.[5] B65D *55/02*
U.S. Cl. 215—232 **13 Claims**



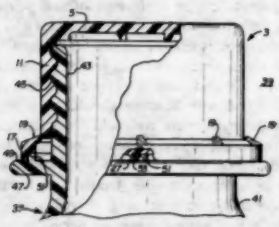
1. Capliner/innerseal composite comprising a planar capliner having sufficient resilience such that when subjected to shear force, out-of-plane deformation will occur to convert some of said shear force to peel force, a layer of release film applied to one major surface of said capliner, a first layer of adhesive which bonds the release film to an innerseal, and a second layer of adhesive which is capable of bonding the innerseal to the mouth of a container, the adhesion between said layer of release film and said capliner being less than the adhesion between said layer of release film and said first layer of adhesive.

4,930,647

TAMPER INDICATING CLOSURE SYSTEM UTILIZING AXIALLY EXTENDING RATCHET

Herbert V. Dutt, Sarasota, Fla., and Duane H. Lewis, Claysville, Pa., assignors to Continental Plastics, Inc., Triadelphia, W. Va.

Filed Jan. 24, 1989, Ser. No. 301,239
Int. Cl.[5] B65D *41/34*
U.S. Cl. 215—252 **25 Claims**



1. A closure system comprising:

a container having a neck portion with external threads thereon, and a generally laterally extending surface axially spaced from said external threads; and

a closure comprising:

a cap having an end wall and an annular skirt extending axially from said end wall and terminating in an annular free end, said skirt having internal threads complimentary to the external threads on the container neck for selectively screwing said closure onto said container neck;

an annular tamper band having first and second axially displaced ends; and

frangible bridge members detachably securing the first end of said tamper band to the free end of said skirt;

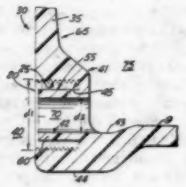
said closure system further including cooperating ratchet members projecting axially toward one another from attachment points on said second end of the tamper band and on the generally laterally extending surface of the container, said ratchet members defining substantially axially projecting engagement surfaces which when engaged prevent rotation of the tamper band with the skirt as the closure is rotated to unscrew the closure from the container neck thereby fracturing the frangible bridges and separating the tamper band from the skirt, said engagement surfaces being dimensioned to remain axially aligned for engagement throughout any initial axial movement of the tamper band with the skirts as the closure is unscrewed prior to fracture of said bridges.

4,930,648

TRIPLE SEAL MOLDED OUTLET FOR PLASTIC STORAGE CONTAINER

Gary W. Hundt, Fort Worth, Tex., assignor to Essex Environmental Industries, Inc., Hurst, Tex.

Filed Jun. 8, 1989, Ser. No. 363,503
Int. Cl.[5] B65D *90/00*
U.S. Cl. 220—1 B **14 Claims**



1. A plastic container having an outlet comprising;

a first cylindrical surface extending from an outer surface of a wall of said container partly through said wall, said cylindrical surface defining a first cylindrical opening with a first diameter;

a flat annular surface within said wall integral with and essentially perpendicular to the first cylindrical surface;

a second cylindrical surface integral with and essentially perpendicular to the flat annular surface, and essentially parallel to the first cylindrical surface;

the second cylindrical surface being part of an inner collar extending from an inner surface of the container, the inner collar defining a second cylindrical opening having a second diameter less than the first diameter, the second cylindrical opening overlapping the first opening and extending into the container.

10. A triple sealing outlet for a plastic container comprising an annular U-shaped channel positioned within a wall of the container for receiving a connector;

the U-shaped channel comprising first, second and third sealing surfaces;

the first sealing surface in the shape of an inner surface of a cylinder, extending from the outer wall of the container into the U-shaped channel, the inner surface defining a

first cylindrical opening and being threaded for engaging and sealing a threaded outer surface;

the second surface being essentially annular and essentially perpendicular to the first sealing surface, the second surface forming a stop for, and adapted to mate with a side surface of the connector for sealing the side surface;

the third sealing surface being essentially parallel to the first sealing surface and essentially perpendicular to the second sealing surface, for engaging and sealing an inner surface of the connector;

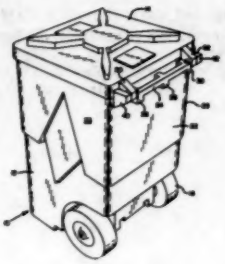
the third sealing surface being part of an inner collar extending from an inner wall of the container, the collar defining a second cylindrical opening for allowing communication between the connector and the interior of the container.

4,930,649

REFUSE CONTAINER WITH MOLDED HINGE

John B. Moser, Seattle, Wash., assignor to North American Roto-Molding Corp., Vancouver, Wash.

Filed Aug. 18, 1989, Ser. No. 395,545
Int. Cl.[5] B65D *43/14*
U.S. Cl. 220—1 T **4 Claims**



1. A portable molded refuse container having a lid pivotally attached to the body in a hinged arrangement comprising,

a molded body having side walls, end walls and a bottom, a first hinge means and a handle means both integrally molded to an end wall of said body, said first hinge means including a pair of brackets projecting from the end wall with a bracket laterally spaced from each end of the handle means;

and a molded lid, said lid having a second hinge means integrally molded with said lid, said second hinge means including a pair of hinge sections projected from the lid and into the spacings between the brackets and handle means of the body, and connecting means pivotally connecting the hinge sections of the second hinge means to the brackets of the first hinge means, and said hinge sections and handle means being cooperatively configured whereby the lid is supported in part on said handle means.

4,930,650

SPENT NUCLEAR FUEL SHIPPING BASKET

Alan H. Wells, Duluth, Ga., assignor to Nuclear Assurance Corporation, Norcross, Ga.

Filed Apr. 17, 1989, Ser. No. 338,861
Int. Cl.[5] G21F *5/00*
U.S. Cl. 220—21 **15 Claims**

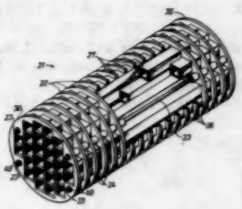
1. A basket for a cask for transporting nuclear fuel elements, said basket comprising a plurality of sleeve members, each of said sleeve members having interior cross-section dimensions for receiving a nuclear fuel assembly such that the assembly is restrained from lateral movement within said sleeve member,

a plurality of apertured disk members,

means for axially aligning the apertures in said disk members,

means for maintaining said disk members in fixed spaced relationship to form a disk assembly, comprising an array of disks, the aligned apertures of said disks being adapted to receive said sleeve members and maintain them in fixed spaced relationship,

first and second apertured end caps, the apertures of which are stepped to form first and second different cross-sectional aperture dimensions and forming a shoulder therebetween, the first cross-sectional dimensions of each aperture being adapted to receive the end of a sleeve, so that said end bears against said shoulder and the second cross-sectional dimension of each aperture being substantially the same as the internal cross-section of said sleeve,



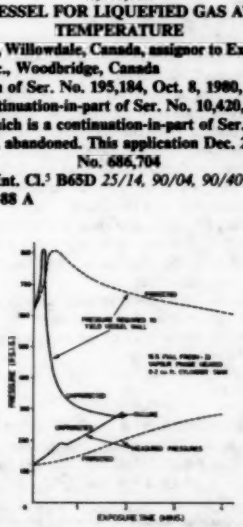
and means for maintaining said first end cap to one end of the disk assemblies and said second end cap to the other end of said disk assembly with the apertures in said end caps axially aligned with the apertures in said disks.

4,930,651

STORAGE VESSEL FOR LIQUEFIED GAS AT AMBIENT TEMPERATURE

Andrew Szego, Willowdale, Canada, assignor to Explosafe North America Inc., Woodbridge, Canada

Continuation of Ser. No. 195,184, Oct. 8, 1980, abandoned, which is a continuation-in-part of Ser. No. 10,420, Feb. 8, 1979, abandoned, which is a continuation-in-part of Ser. No. 888,476, Feb. 20, 1978, abandoned. This application Dec. 27, 1984, Ser. No. 686,704
Int. Cl.[5] B65D *25/14, 90/04, 90/40*
U.S. Cl. 220—88 A **5 Claims**



1. A storage vessel resistant to rupture of its wall, said vessel being closed and containing at ambient temperature and superatmospheric pressure a liquefied gas that remains stable at elevated temperature and exerts an increasing vapor pressure with increasing temperature, and having at least on a selected area of the interior surface of its wall that is exposed to a heating hazard an interior covering of a flame permeable, heat-resistant, heat-conductive porous material in thermal

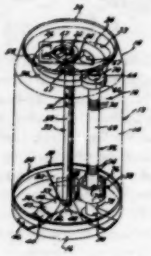
contact with the wall of the vessel and extending into the liquefied gas in the vessel and delaying increase in temperature of the wall when exposed to a heat source located exteriorly of the vessel, whereby rupture of the wall of the vessel is deferred or prevented, wherein said covering extends as a lining over the entire interior surface of the vessel wall, and wherein said lining surrounds and encloses an empty volume in the central region of the vessel.

4,930,652

DRINKING/DISPENSING DEVICE FOR BEVERAGE CONTAINERS

Peter F. Murphy, Grosse Pointe, and James H. Kurtz, Jr., Grosse Pointe Farms, both of Mich., assignors to MK Industries, Grosse Pointe Farms, Mich.

Filed May 3, 1989, Ser. No. 347,171
Int. Cl.[5] B65D *47/06*
U.S. Cl. 220—90.2 **21 Claims**



1. A device for a container including a tubular body having a closed end and an open end and a longitudinal axis, a lid secured to the open end and having an orifice, a closure tab pivotally connected to the lid and temporarily closing the orifice, an actuating member pivotally secured to the lid and being manually actuated for moving the closure tab into the interior of the body to open the orifice, said device comprising:

a conduit disposed within the body;

means disposed within the body and adapted to engage the body for supporting said conduit substantially parallel to the longitudinal axis of the body;

means forming a float for elevating said conduit through the orifice in the lid when liquid is present within the body and the closure tab is deflected into the interior of the body to open the orifice; and

including means for rotating said conduit to align said conduit with the orifice of the lid when the closure tab is deflected into the interior of the body to open the orifice by the actuating member.

4,930,653

REFUSE CONTAINER CADDY APPARATUS

Daniel Machado, 2767 Canterbury, Northbrook, Ill. 60062

Filed Jul. 24, 1989, Ser. No. 383,597
Int. Cl.[5] B65D *21/02*
U.S. Cl. 220—23.4 **10 Claims**

1. A refuse container caddy apparatus comprising, in combination,

at least one first refuse container of polygonal cross-sectional configuration, and

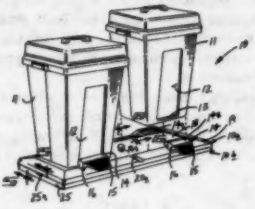
a first support tray formed with a first recess floor dimensioned to receive the first refuse container, and

a surrounding first wall formed about the first floor, and

a plurality of opposed latch means pivotally mounted within the first wall on opposite sides of the first floor for selective registration with opposed horizontal steps formed within opposed side walls of the first refuse container, and

a second support tray selectively securable to the first securement tray, and

first securement means formed about the perimeter of the first support tray for selective securement to a second



securement means formed about the perimeter of the second support tray to enable selective securement of the first support tray in overlying relationship to the second support tray

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4,930,654

RESEALABLE FLIP-TOP CAN

Richard A. Thibeault, and Deborah M. Thibeault, both of 7 Saxford La., Nashua, N.H. 03063

Filed Mar. 30, 1989, Ser. No. 331,682
Int. Cl.[5] B65D *51/18*
U.S. Cl. 220—253 **14 Claims**

1. A resealable flip-top fastenable to a container of a beverage can and opened by a ring, said resealable flip-top comprising:

a can top having a first area that is ruptured by said ring fastened to said can top by a rivet to thereby open a first opening of said can in order to dispense a beverage therein, and

a circular sealing top permanently fastened to the top of said can top, said sealing top covering substantially all of said can top, said sealing top having a second opening, and that must be moved into a first position where it is in registration with said first opening in order to dispense the beverage in said can, said sealing top being moved into a second position where said second opening is out of registration with said first opening in order to reseal said can.

4,930,655

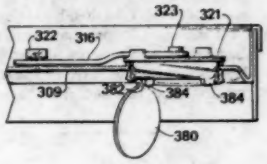
EASY-OPEN CONTAINER WITH NON-DETACHABLE CLOSURE

Robert A. Wells, 107 N. Lakeside Dr., Kennesaw, Ga. 30144

Filed Feb. 27, 1989, Ser. No. 316,092
Int. Cl.[5] B65D *39/02, 41/04*
U.S. Cl. 220—258 **27 Claims**

1. An easy-open container with non-detachable closure means including an end wall, an annular lip formed in and bounding a portion of said end wall, a cap member movably mounted to said end wall with said cap member including means for fastening to said annular lip, the improvement

therein comprising an openable panel at least partially defined in the bounded portion of said end wall by a selectively separable region of predetermined weakness, said cap member and said annular lip including cooperative engaging surfaces



formed to flex at least a portion of said annular lip radially outwardly and separate said openable panel from said end wall upon movement of said cap member in a predetermined direction relative to said annular lip to form an opening in said end wall through which container contents can be dispensed.

4,930,656

CONTAINER LID WITH A TEAR SKIRT

Henry J. Blanchette, Leominster, Mass., assignor to Plastican, Inc., Leominster, Mass.

Filed Feb. 15, 1989, Ser. No. 311,116
Int. Cl.[5] B65D *17/40*
U.S. Cl. 220—276 **17 Claims**

1. A lid configured to be mounted on a container having a locking flange about an upper edge thereof, said lid comprising:

(a) an upper cap portion with a depending outer outer sidewall;

(b) a lower portion of said sidewall defining a tear skirt;

(c) an undulating annular groove in said sidewall forming a frangible thin wall section between said upper cap portion and said tear skirt, said undulating annular groove facilitating separation of said upper cap portion and said tear skirt;

(d) a plurality of spaced fastening means circumferentially disposed on an upper portion of said sidewall, said fastening means configured to be in locking engagement with the container locking flange for locking said lid on the container; and

(e) a plurality of bendable flaps formed at a lower margin of said upper cap portion by said undulating annular groove when said tear skirt is separated from said upper cap portion, all of said fastening means being disposed on said upper cap portion that remains after separation of said tear skirt;

(f) said undulating annular groove having a relatively long and straight portion that is disposed in a path that passes below said fastening means along a lower edge of said flaps and a relatively short and curved section that is disposed in a path that passes between adjacent ones of said fastening means.

4,930,657

FLOATABLE DRAIN PLUG

William T. Walker, 28 Tamela Dr., Little Rock, Ark. 72207

Filed Dec. 8, 1988, Ser. No. 281,330
Int. Cl.[5] B65D *53/00*
U.S. Cl. 220—235 **25 Claims**

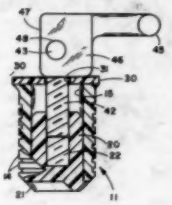
1. A drain plug adapted to float on water wherein the plug is normally associated with a drain opening

such that the drain plug floats to the surface of the water in the event that the drain plug becomes loose from the drain opening so that the drain plug may be retrieved conveniently, said drain plug comprising:

a radially expandable, hollow cylindrical body having an upper end and a lower end, the lower end of the body having an annular surface;

an expander assembly disposed within the hollow body, the expander assembly including a sleeve, the sleeve having an end portion having a unitary annular flange formed integrally thereon, the annular flange on the sleeve engaging the annular surface of the body thereby forming a seal with the lower end of the body;

a keying means between the sleeve and the hollow body to prevent rotation therebetween;



a manually manipulatable handle connected to the expander assembly, the handle extending outwardly from the upper end of the body;

means for radially expanding and contracting the body; including means for retracting the sleeve within the body such that the annular flange on the sleeve which engages the annular surface on the end of the body causes the body to axially contract while radially expanding the body;

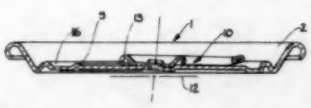
such that when the drain plug is inserted into the drain opening, the body may be radially expanded to conform to the drain opening so that fluid is prevented from passing through the drain opening, and the drain plug may be radially contracted and easily removed from the drain opening.

4,930,658

EASY OPEN CAN END AND METHOD OF MANUFACTURE THEREOF

Carl McEldowney, Russia, Ohio, assignor to The Stolle Corporation, Sidney, Ohio

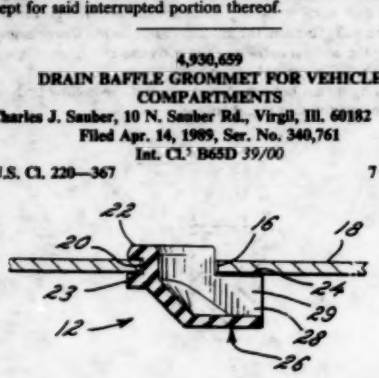
Filed Feb. 7, 1989, Ser. No. 307,441
Int. Cl.[5] B65D *17/34*
U.S. Cl. 220—269 **12 Claims**



1. In an easy open can end having a score line defining a tear strip, said score line being generally U-shaped with the open end of the U towards the center of said can end, said open end being interrupted so that said tear strip will be captively retained on the underside of said can end when torn open, a rivet connected to said can end adjacent the open end of the U outside said score line, a pull tab secured to said can end by means of said rivet, said pull tab having a nose portion to initiate a tear along said score line upon lifting of said pull tab and a finger portion opposite said nose portion, and means for reducing force required to fracture said score line by causing the force to be applied substantially all in shear, said force

reducing means including a plastically deformed portion of said can end at least partially around the base of said rivet, causing a tilt in said rivet toward said finger portion of said pull tab, whereby said pull tab, when initially raised, fractures said score line immediately in front of said rivet, causing said tear strip to bend downwardly along a transverse line in front of said rivet to allow venting of internal pressure, and when raised further, causes said score line to tear therearound, except for said interrupted portion thereof.

4,930,659
DRAIN BAFFLE GROMMET FOR VEHICLE COMPARTMENTS
Charles J. Sauber, 10 N. Sauber Rd., Virgil, Ill. 60182
Filed Apr. 14, 1989, Ser. No. 340,761
Int. Cl.[5] B65D *39/00*
U.S. Cl. 220—367 **7 Claims**

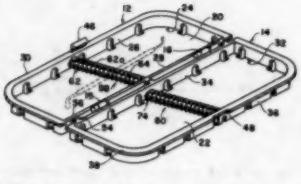


1. A drain device for use with a vehicle body floor having an opening therein comprising:

a unitarily formed hollow structure of flexible elastomeric material including an inlet end portion, an outlet end portion and an intermediate portion having an outer periphery smaller than the adjacent peripheral parts of the inlet and outlet portions and the intermediate portion periphery corresponding substantially to the periphery of said body floor opening, the outlet end portion being in the form of a right angle hood having at least a top and side walls, and

said drain device being adapted to be deformably inserted into the body floor opening and positively held in the opening by the peripheral parts of said inlet and outlet portions in their normal undeformed conditions.

4,930,660
COMBINATION WORKING TRAY AND STERILIZATION CASE FOR MEDICAL INSTRUMENTS
Don D. Porteous, 2794 Moraga Dr., Los Angeles, Calif. 90024
Filed Mar. 6, 1989, Ser. No. 319,279
Int. Cl.[5] B65D *1/36*
U.S. Cl. 220—367 **10 Claims**

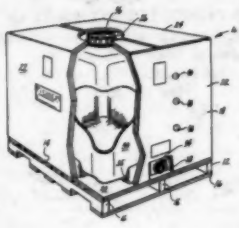


1. A combination working tray and sterilization case for medical instruments comprising:

first and second ventilated shell halves pivotally connected to each other for movement between open and closed positions, thereby forming a tray in the open position and a sterilization case in the closed position, wherein each of the first and second shell halves comprises a planar portion and a sidewall portion including two parallel, longitudinally extending, opposite sidewalls; and

holding means for releasably holding medical instruments, said holding means comprising a first coil spring disposed in the first shell half and having a plurality of spaced apart convolutions with any two adjacent convolutions being operable to frictionally engage a medical instrument, said first coil spring being mounted obliquely relative to the opposite sidewalls of the first shell half at an angle sufficient to orient the convolutions parallel to the opposite sidewalls, and said holding means further comprising a first rhomboid bar extending between the opposite sidewalls of the first shell half and through said first coil spring.

4,930,661
COMPOSITE SHIPPING CONTAINER
John J. Voorhies, Strongsville, Ohio, assignor to Hoover Group, Inc., Roswell, Ga.
Continuation-in-part of Ser. No. 28,865, Mar. 23, 1987, Pat. No. 4,793,519. This application Nov. 21, 1988, Ser. No. 274,425
Int. Cl.[5] B65D *35/14*
U.S. Cl. 220—465 **2 Claims**



1. A composite disposable one-way container having vertical stacking capabilities comprising:

a. a pallet member having a top surface and depending legs spaced apart to enable extension of forklift tines therebetween;

b. an outer container of rectangular shape having a rectangular bottom wall supported on and secured to said pallet top surface;

said outer container having upright continuous side walls and a substantially flat top wall formed of solid fiber paperboard;

said top wall having a central fill opening and one of said side walls having a discharge opening located adjacent said bottom wall;

c. metal crimp ring members connecting said bottom and top walls at the peripheries of said bottom and top walls to the bottom and top ends, respectively, of said side walls;

d. a unitary blow molded plastic inner tank positioned upright inside said outer container and having side walls sufficiently thin to prevent said tank from being self supporting, said tank having an inlet fitting extending into said container fill opening, and a discharge fitting extending into said container discharge opening; and

e. a support structure for said inner tank on said outer container bottom wall, said structure having a complementary surface abutting said inner tank and said outer container side walls so as to nest said inner tank on said support structure and provide support for said discharge fitting;

said container side walls being of a construction to maintain said tank in an upright position in said container when the tank is filled with a liquid to be transported, said container side walls being free of obstruction on the inner sides thereof so that said inner tank side walls are free to engage said inner sides of the container side walls directly when the tank is filled with a liquid to be transported, and said container top wall being of similar

construction to enable two such containers to be stacked two high.

4,930,662

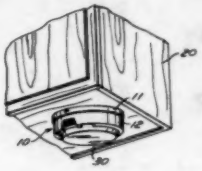
FLEXIBLE PLATE DISPENSER AND IMPROVED FLEXIBLE PLATE

Louis D. Carrillo, 6611 Rostrata, Buena Park, Calif. 90621

Continuation of Ser. No. 298,655, Jan. 18, 1989, abandoned, which is a continuation of Ser. No. 69,292, Jul. 2, 1987, abandoned. This application Jun. 14, 1989, Ser. No. 365,918

Int. Cl.[5] B65H *1/00*

U.S. Cl. 221—45 **9 Claims**



1. A dispenser for flexible plates comprising:

a generally cylindrical container sized for storing stacked flexible plates in an upright vertical orientation the container formed having an interior region substantially complimentary to the periphery of the stacked flexible plates and including a generally cylindrical bottom aperture sized to permit the central portion of selected bottom ones of said stacked flexible plates to extend therethrough;

a peripheral flange formed about a substantial portion of the bottom aperture of the container to provide a guide surface for sliding selected bottom ones of said stacked plates radially outward from said container, said flange extending radially inward therefrom through a distance sufficient to engage the peripheral edge portion of a bottom one of the stacked plates in a generally contiguous orientation and support the stacked plates within the interior region;

at least one tab formed at the bottom aperture of the container, disposed between opposite ends of the flange and extending radially inward through a distance sufficient to engage the peripheral edge portion of the bottom one plate;

wherein the bottom aperture, the flange, and the at least one tab permit selected bottom ones of the stacked flexible plates to be manually grasped at their peripheral edge portion adjacent said at least one tab and be warped in order to cause such plates to pass downwardly beyond engagement with the at least one tab, and may then be slid radially outward along the guide surface of said peripheral flange from the container through its bottom aperture until they no longer engage the flange.

4,930,663

ARTICLE ALIGNMENT UNIT

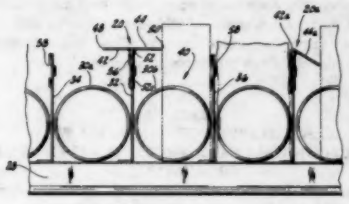
Leonard A. Ficken, St. Louis County, Mo., assignor to Unidynamics Corporation, New York, N.Y.

Filed Oct. 17, 1988, Ser. No. 258,848

Int. Cl.[5] G07F *11/36*

U.S. Cl. 221—75 **11 Claims**

5. An article alignment unit, adapted for use in a vending machine comprising a cabinet having a rear and front, at least one tray within the cabinet carrying at least two dispensing helices extending side-by-side from rear to front of the cabinet with each helix being selectively driven for advancing articles to be dispensed placed on the tray between convolutions of the helix, a generally vertical central partition between the two helices and having a top edge margin extending substantially the length of the helices, and first and second generally vertical outer partitions on opposite sides of the two helices with first and second article compartments being defined between the central partition and the first and second outer partitions, respectively, each compartment containing one of the helices, the article alignment unit comprising first and second elongate guide members hingedly connected together and adapted for independently pivoting about a common axis parallel with and adjacent to the top edge margin of the central partition, the first guide member defining a first guide surface which is varyingly positionable by pivoting the first guide member about the pivot axis from a generally vertical position adjacent



the central partition to a position extending toward the first outer partition and above the corresponding helix for restricting lateral movement of articles extending above the helix within the first compartment, the second guide member defining a second guide surface which is varyingly positionable by pivoting the second guide member about the pivot axis from a generally vertical position adjacent the central partition to a position extending toward the second outer partition and above the corresponding helix for restricting lateral movement of articles extending above the helix within the second compartment.

4,930,664

SELF-PRESSURIZING SPRAYER

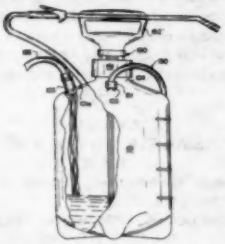
Garry L. Ellison, Grand Rapids, Mich., assignor to Root-Lowell Manufacturing Company, Lowell, Mich.

Continuation-in-part of Ser. No. 58,519, Jun. 5, 1987, Pat. No. 4,782,982, which is a continuation-in-part of Ser. No. 3,469, Jan. 15, 1987, abandoned. This application Jun. 9, 1988, Ser. No. 204,625

The portion of the term of this patent subsequent to Nov. 8, 2005, has been disclaimed.

Int. Cl.[5] B65D *83/14*

U.S. Cl. 222—1 **36 Claims**



1. A portable sprayer for dispensing water or water solutions under pressure, comprising:

a closed receptacle for containing water or water solutions under pressure, said receptacle including a dispensing outlet operably connected to dispensing valve means which can be opened to dispense water or water solutions under pressure or closed to seal said container;

a one-way valve extending from outwardly of said recepta-

cle to inside the receptacle, said one-way valve including a quick disconnect fitting operably connected thereto for connection to a source of water under pressure and comprising means for allowing entry of water or water solutions into said receptacle while preventing back flow out of said receptacle, whereby said receptacle is pressurized during entry of water into said receptacle when said dispensing valve means is closed;

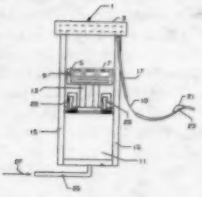
said dispensing valve means including lock means for locking said dispensing valve means into an open position whereby one can clean the interior of said sprayer by connecting a source of water under pressure to said quick disconnect connector of said one-way valve and locking said dispensing valve open to allow cleaning water to continually flush through said sprayer.

4,930,665

LIQUID DISPENSING SYSTEM WITH ELECTRONICALLY CONTROLLED VALVE REMOTE FROM NOZZLE

George T. Devine, Kettering, Ohio, assignor to Gilbarco Inc., Greensboro, N.C.

Filed Sep. 19, 1988, Ser. No. 246,673
Int. Cl.[5] B67D 5/06
U.S. Cl. 222—28 **22 Claims**



1. A fuel dispensing system comprising:

a nozzle for dispensing liquid;

flow rate selection means mounted integral with said nozzle, including transducer means for selectively producing a flow rate signal indicative of a desired flow rate for dispensing a fuel;

a hose for conveying fuel;

control means electrically connected to said flow rate selection means, said control means being responsive to said flow rate signal for producing a control signal; and

electrically operated flow control valve means, responsive to said control signal for delivering fuel into one end of said hose at said desired flow rate, the other end of said hose being coupled to an inlet of said nozzle.

4,930,666

JUICE DISPENSING SYSTEM FOR A REFRIGERATOR DOOR

Arthur G. Rudick, Marietta, Ga., assignor to The Coca-Cola Company, Atlanta, Ga.

Filed Oct. 28, 1988, Ser. No. 264,011
Int. Cl.[5] B67D 5/06
U.S. Cl. 222—181 **8 Claims**

1. A vented spout and actuator assembly for dispensing a beverage from a container by gravity feed at a substantially constant flow rate comprising:

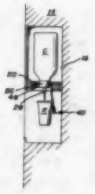
a valve assembly collar connectable to a discharge opening in the container;

a vent tube extending from a location in said collar to a location in said container spaced from said discharge opening, said vent tube defining a vent passage therethrough;

said collar having a discharge wall with a liquid discharge port therethrough;

a rotary valve element mounted for rotation in said discharge wall between open and closed positions, said rotary valve element having a liquid discharge conduit and a vent conduit therethrough, alignable with said liquid discharge port and said vent passage, respectively, when in said open position;

a spout extending from the liquid discharge conduit of said rotary valve element; and



an actuation lever separate from said spout extending from said rotary valve element for rotating said valve element between said open and closed position; and

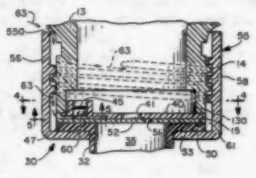
actuator means for said lever and having a first end for engagement by a beverage receptacle at a location spaced from said spout and a second end connected to said actuation lever, whereby said rotary valve element is movable between said open and closed positions by movement of the beverage receptacle for dispensing said beverage.

4,930,667

BREATHING DEVICE FOR SOAP DISPENSER

Charles R. Holzner, Sr., Chicago, Ill., assignor to Steiner Company, Inc., Chicago, Ill.

Filed Jan. 23, 1989, Ser. No. 299,934
Int. Cl.[5] B67D 5/58
U.S. Cl. 222—189 **6 Claims**



1. A discharge assembly for a liquid soap dispenser including a liquid soap container having an outlet opening, said discharge assembly comprising an elongated flexible resilient nipple having a normal expanded condition defining a discharge chamber for accommodating a charge of liquid soap and having a longitudinal axis, said nipple having an inlet opening at one end thereof and being provided at the other end thereof with a normally closed discharge slit, means mounting said nipple on the container with said inlet opening disposed in registry with the container outlet opening, check valve means including a flat membrane extending across said inlet opening and having a valve slit formed therein centrally thereof disposed between said inlet opening and the container outlet opening, a flat backing disc overlying said membrane and having an opening therein centrally thereof disposed in registry with said valve slit, and breathing means carried on the back of said backing disc and including a well upstanding from said backing disc, a semipermeable material in said well permit-

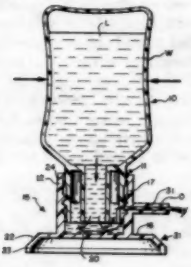
ting air to flow therethrough but impermeable to soap, said well being in fluid communication with said soap container and outside said soap container establishing an air passage to said soap container, said nipple being laterally compressible in a direction substantially perpendicular to said axis, movement of said nipple to the compressed condition thereof raising the pressure in said discharge chamber for closing said check valve and ejecting liquid soap from said discharge slit, movement of said nipple back to the expanded condition thereof lowering the pressure in said discharge chamber for closing said discharge slit and opening said check valve to draw a new charge of liquid soap into said discharge chamber, passage of air through said breathing means rapidly reestablishing air pressure in said soap container permitting rapid refill of said discharge chamber with soap and rapid activation of said discharge means.

4,930,668

DISPENSING PACKAGE FOR DISPENSING LIQUIDS

Thomas J. Krall, Toledo, Ohio, assignor to Owens-Illinois Plastic Products Inc., Toledo, Ohio

Filed Feb. 2, 1989, Ser. No. 305,059
Int. Cl.[5] B65D *37/00*
U.S. Cl. 222—212 **6 Claims**



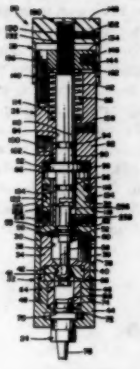
1. A dispensing package for dispensing liquid comprising
an injection blow molded container having a flexible body,
an integral neck comprising an integral outer wall and an integral inner wall defining a space between said outer wall and said inner wall, said space being closed at one end nearest the container and open at the other end,
said inner wall defines a dispensing opening,
a plastic closure having a transverse wall, a peripheral skirt and a peripheral foot for engaging a flat surface or the like, said peripheral skirt having an outlet opening,
interengaging means between the closure and the outer wall for holding the transverse wall in sealing engagement with the inner wall of the neck for closing the dispensing opening,
means providing a seal between the skirt of the closure and the outer surface of the outer wall,
said closure being movable axially between a first position sealingly engaging the neck of the container and a second position wherein fluid is permitted to flow through the dispensing opening and to said outlet opening in the skirt so that when the flexible body of the container is thereafter compressed a predetermined quantity of the contents is dispensed through the outlet opening in the wall of the skirt.

4,930,669

SEALLESS MODULAR DISPENSER

Ewald F. Dickau, Glastonbury, and John P. Breault, New Britain, both of Conn., assignors to Loctite Corporation, Newington, Conn.

Continuation-in-part of Ser. No. 57,614, Jun. 3, 1987, abandoned. This application Apr. 4, 1988, Ser. No. 176,877
Int. Cl.[5] G01F *11/06*
U.S. Cl. 222—309 **22 Claims**



1. Apparatus for dispensing precise quantities of a fluid product comprising:
dispensing means for dispensing the fluid product when in any one of a plurality of open configurations and for stopping or prohibiting the dispensing thereof when in a closed configuration;
actuator means for effecting said dispensing means between the open and closed configurations comprising an operative mechanism and an actuator body; and
adjustment means for selectively adjusting operation of said actuator means enabling it to effect said dispensing means between any one of a plurality of open configurations and the closed configuration, said adjustment means comprising a threaded shank integral with said operative mechanism, a tubular stud internally threaded and threadedly engaged with said shank, said stud also being externally threaded, said external threads being coarser than said internal threads, a stroke adjuster nut threadedly received on said stud and keyed to said actuator body to prevent relative rotation therebetween about an actuating axis, said adjuster nut being movable along said actuating axis coincidental with the rotation of the stud about said actuating axis to a plurality of positions between and inclusive of a first position, relative to the terminal surface of said actuator body, wherein said operative mechanism is rendered inoperative and said dispensing means is in the closed configuration and a second position distant from said first position wherein said operative mechanism is operative to its greatest extent, thus enabling said dispensing means to open to its fully open position.

4,930,670

PUMPING MECHANISM FOR DISPENSING LOTION IN BOTTLE/CONTAINER

Frank Kuo, Taichung Hsien, Taiwan, assignor to Smiley Chien, Taipei, Taiwan

Filed Apr. 25, 1989, Ser. No. 342,838
Claims priority, application Taiwan, Mar. 17, 1989, 78202384
Int. Cl.[5] B65D *88/54*
U.S. Cl. 222—321 **1 Claim**

1. A pumping mechanism comprising:
a hollow cylindrical member having a top portion, a lotion

reservoir room, and an inner wall defining at a lower portion thereof a valve seat, and mounting thereunder a diptube adapted to be placed in a bottle containing therein a lotion for suction up therefrom said lotion into said lotion reservoir room;

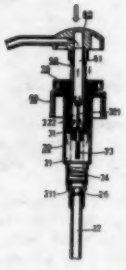
a piston member sleeved in said cylindrical member and movable along said inner wall, said piston including a top annular indentation and at least a bottom annular tooth;

a hollow operating rod having a top end and a bottom end, said bottom end having an inner shoulder surface;

a cap medium including a securing cover and a cap member, said securing cover screwable onto said bottle, said cap member connected to said top portion and having an inner female thread, said cap medium allowing said operating rod to pass therethrough and to protrude from said bottom end in said cylindrical member;

a hollow pressing member lotion-communicable connected to said top end of said hollow-operating rod, and having a bottom male thread engageable with said female thread;

a ball capable of being seated on said valve seat to prevent said reservoir room from communicating with said diptube;



an upper valve positioned in said cylindrical member, having an upper engaging medium engaging with said operating rod, said upper engaging medium including at least two upward wings urging against said shoulder surface, and capable of matching said said piston member to prevent said operating rod from communicating with said reservoir room, and said upper valve including at least a top annular groove engageable with said bottom tooth and including a downward engaging rod having a bottom end split into at least three fingers.

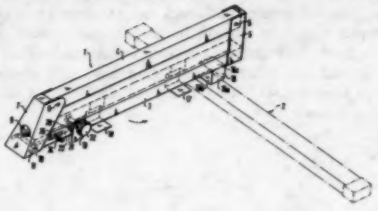
a compression spring method mounted between said upper valve and said valve seat, in a manner that when said pressing member and said operating rod are pressed downward, said operating rod will disengage said upper valve from said piston member to communicate said reservoir room with said operating rod before said bottom end matches against said piston member, and when said pressing member and said operating rod are released, said compression spring will match said upper valve against said piston member again to thus form a vacuum in said reservoir room to in turn allow said ball to leave said valve seat to communicate said reservoir room with said diptube.

4,930,671

ATTACHMENT, PARTICULARLY FOR HOLDING SKIS, SURFBOARDS OR THE LIKE, FOR A CARRIER BAR OF A CARRIER STRUCTURE FOR FITTING EXTERNALLY ON A MOTOR VEHICLE

Tittel, Eberhard, Lagerstrasse 1, D-7981 Grünkraut-Gullen, Fed. Rep. of Germany

Filed Nov. 21, 1988, Ser. No. 273,793
Int. Cl.[5] B60R 9/04
U.S. Cl. 224—319 2 Claims



1. An attachment adapted for holding skis, surfboards or the like on a motor vehicle carrier bar, said attachment comprising:

two elongated clamping elements;

means for hinging said clamping elements together at one end of each clamping element;

a locking element for connecting said clamping elements at the ends of said elements opposite said hinge means,

a first claw and a second claw each disposed on one of said clamping elements at a side of said clamping element opposite the other of said clamping elements; and

securing means adapted for securing said attachment to such a carrier bar;

one of said clamping elements comprising a tubular part;

said locking element comprising a connecting piece;

said securing means comprising a plate with a bent section adapted for securing at least one of said claws to such a carrier bar;

said plate being releasably fastenable to said tubular part and, when said plate is fastened to said tubular part, projecting beyond said side of said clamping element on which said claws are disposed;

said bent section of said plate extending into the interior of said tubular part when said plate is fastened to said tubular part; and

said bent section of said plate comprising means for receiving said connecting piece and securing said plate to said tubular part when said locking element is locked.

4,930,672

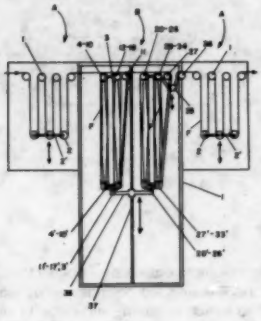
STORING TRANSFER APPARATUS TO INTERCONNECT DEVELOPING AND PRINTING MACHINES FOR CONTINUOUS STRIP PHOTOGRAPHIC MATERIAL

Panontin Renzo, Flume Veneto, Italy, assignor to Gregoris Photo Equipment S.p.A., Azzano Decimo, Italy

Filed Oct. 28, 1988, Ser. No. 264,063
Int. Cl.[5] B65H 20/24
U.S. Cl. 226—119 3 Claims

1. Storing transfer apparatus to interconnect developing and printing machines for continuous strip photographic material, comprising a central unit having a plurality of rollers arranged respectively on an upper, fixed level and on a lower, mobile level to stretch and tauten a strip of material to be stored alternatively from an upper roller to a lower roller, from the lower roller to the upper roller and sequentially in this alternating manner comprising a means in a fixed position having upper transmission rollers on an upper horizontal axis, cooperating with a lower means on a vertically mobile frame with

lower transmission rollers on a lower horizontal axis, below the upper rollers, in which the storing apparatus comprises: at least one upper set of transmission rollers arranged in longitudinal rows parallel to each other, each roller having a head and a rotary axis, the heads being close to each other, with the rotary axis of each roller aligned in one longitudinal row slanted in a one direction from the upper horizontal axis, wherein each set of rollers has an entry end and an exit end and an auxiliary traction roller is disposed at the entry end and the exit end of each upper roller; at least one lower set of transmission rollers arranged in longitudinal rows parallel to each other, each lower roller having a head and a rotary axis, the



heads being close to each other, with the rotary axis of each lower roller aligned in one longitudinal row slanted from the lower horizontal axis, in an opposite direction to the one direction of a corresponding upper row of rollers, the lower set of rollers being included in said vertically mobile frame below the upper set of rollers; wherein the rows of rollers in each set are grouped in parallel pairs having a first row and a second row with opposed slantings forming a herringbone pattern, such that the strip of material to be stored is spiroidally and helicoidally wound according to return runs of the rows, passing sequentially in a first direction from upper roller to lower along the first row and returning in the opposite direction along the second row.

4,930,673

POWDER CHARGE OPERATED SETTING DEVICE

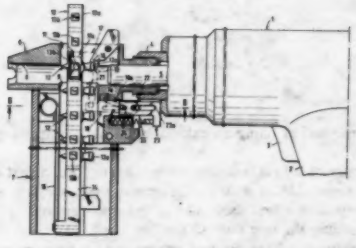
Norbert Pfister, Buchs, Switzerland, assignor to Hilti Aktiengesellschaft, Fürstentum, Liechtenstein

Filed Mar. 2, 1989, Ser. No. 317,854

Claims priority, application Fed. Rep. of Germany, Mar. 2, 1988, 3806626

Int. Cl.[5] B25C *1/14*

U.S. Cl. 227—10 **4 Claims**



1. Explosive powder charge operated setting device comprises a housing, a barrel located within said housing and having an axially extending barrel bore, a muzzle part forming an extension of said barrel and located at one end of said housing, said muzzle part having a muzzle bore forming an axial extension of said barrel bore, a guide magazine located at and extending transversely of said muzzle part and arranged to hold a nail carrier strip containing a plurality of axially extending spaced nails with a head on one end of each said nails, spring means for biasing the nail carrier strip out of said magazine through a first aperture in said muzzle part into said muzzle bore, said carrier strip having a first side and said nail heads projecting axially outwardly from said first side, said nail heads having a diameter less than the diameter of said muzzle bore, wherein the improvement comprises that said muzzle part has a second aperture located diametrically opposite and aligned with said first aperture and forming an outlet opening for said carrier strip from said muzzle bore, and transport means mounted on said muzzle part for displacing said carrier strip opposite to the direction in which said strip is biased by said spring means in said magazine through a distance at least half the difference between the diameter of said nail head and of said muzzle bore.

4,930,674

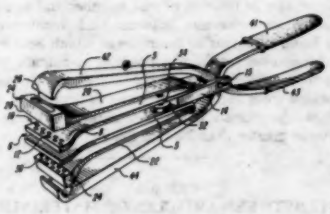
SURGICAL STAPLER

Jacob H. Barak, Oranit, Israel, assignor to Abiomed, Inc., Danvers, Mass.

Filed Feb. 24, 1989, Ser. No. 315,286

Int. Cl.[5] A61B *17/00*

U.S. Cl. 227—179 **21 Claims**



1. A surgical stapler comprising

an elongated instrument body extending along an axis and having an interior axial passage for passage of a tubular member therethrough and an enlarged head such that an end of the tubular member may be everted over the head and secured about the instrument body,

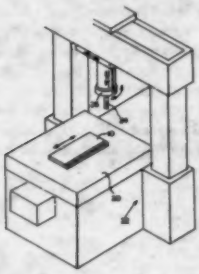
a collar structure removably placeable about the instrument body adjacent the head,

a circular staple cartridge and a circular staple anvil each contained in a different one of said head and said collar structure, and

means for driving staples against the anvil to staple the everted end of the tubular member to a layer of tissue placed between said head and said collar structure

said instrument body being formed in plural separable parts for allowing placement of said tubular member in and removal of said tubular member from said interior axial passage.

4,930,675
METHOD OF FORMING HARD FACINGS ON MATERIALS
Gerald M. Bedford, Southsea, and Peter J. Richards, Havant, both of United Kingdom, assignors to Friction Technology Limited, United Kingdom
Continuation of Ser. No. 238,345, Aug. 12, 1988, abandoned. This application Sep. 26, 1989, Ser. No. 412,418
Claims priority, application United Kingdom, Feb. 17, 1986, 8603832
Int. Cl.[5] B23K 20/12
U.S. Cl. 228—112 22 Claims

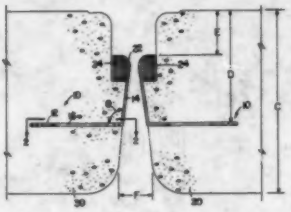


1. A method for applying a hard facing along an edge of a relative soft substrate, said method comprising: forming a recess along the edge of the substrate; rotatably supporting a member of relatively hard material for forming the hard facing, said member having an end face and a rotation axis that passes through said end face; and rotating said member of relative hard material while pressing its end face against the substrate within the recess and bringing about relative translational movement between said member and the substrate so that said member moves along the edge of the substrate within the recess, whereby the relatively hard material is deposited along the edge within the recess by rotatory friction surfacing, the pressure, rate of rotation of said member and rate of relative translational movement between said member and the substrate being such that an interface at which heat is generated by friction moves from a position in contact with the substrate to a position along the rotating member spaced a small distance from the substrate so as to deposit on the substrate within the recess a homogeneous layer of the relatively hard material greater than 0.2 mm thick.

4,930,676
JOINT BETWEEN ARTICLES OF MATERIALS OF DIFFERENT COEFFICIENTS OF THERMAL EXPANSION
William G. McNaught, Broughty Ferry, and Roger Hill, Silverburn, both of Scotland, assignors to Ferranti International PLC, United Kingdom
Continuation of Ser. No. 564,907, Dec. 23, 1983, abandoned. This application May 23, 1986, Ser. No. 870,301
Claims priority, application United Kingdom, Dec. 23, 1982, 8236600
Int. Cl.[5] B23K 21/00
U.S. Cl. 228—115 4 Claims

1. A method of providing a joint between articles of materials of different coefficients of thermal expansion, comprising placing a preform of indium, produced immediately before providing said joint such that it is at least substantially free from impurities, between uncoated surfaces of the articles, which article surfaces are required to be joined together, the otherwise untreated surfaces being at least substantially free from impurities, and, at ambient temperature, applying the necessary maximum pressure to compress the indium between the surfaces, and then at least twice reducing and reapplying the maximum pressure whereby a mechanically strong joint is obtained.

4,930,677
CONCRETE CONNECTOR
Michael J. A. H. Jolliffee, 13 Buckingham St., Cambridge, Mass. 02138
Filed May 16, 1988, Ser. No. 194,522
Int. Cl.[5] B23K 28/02
U.S. Cl. 228—120 5 Claims



1. A concrete structure comprising a connector having two generally flat plates connected together along one edge to form an elongated structure having substantially an L-shaped cross section wherein when one said plate is held firmly within said concrete, said other plate protrudes from said concrete, wherein one portion of said other plate is completely removed on all sides from said concrete, and another portion of said plate lies close to said concrete, and said other plate is available for connection with another said connector by direct welding or clamping of said other plate to said other connector while said other plate is moved away from said concrete.

4,930,678
HEAT-RESISTANT EXHAUST MANIFOLD AND METHOD OF PREPARING SAME
Frederick F. Cyb, 23351 Filmore, Taylor, Mich. 48180
Filed Nov. 25, 1988, Ser. No. 275,949
Int. Cl.[5] B23K 31/02
U.S. Cl. 228—176 11 Claims

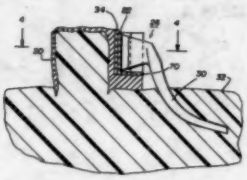
1. A method of lining an exhaust manifold, comprising the steps of:
(a) applying a heat-resistant compound to form a first liner on the inside of a first sheet-metal shell, the first shell comprising a first section of an exhaust manifold;
(b) bonding the first liner to the first shell;
(c) applying a heat-resistant compound to form a second liner on the inside of a second sheet-metal shell, the second shell comprising a second section of the exhaust manifold and being alignable with the first section;

(d) bonding the second liner to the second shell; and then
(e) joining the first and second shells together in an aligned configuration to form an exhaust manifold or a portion thereof.

4,930,679
BRAZING OR SOLDERING JIG FOR DENTAL ATTACHMENTS

Robert Q. Manley, 507 Seventh St. West, Palmetto, Fla. 34221, and Jerome J. Goodman, 39 Highwood Ave., Tenafly, N.J. 07670

Filed Nov. 22, 1988, Ser. No. 274,854
Int. Cl.[5] B23K 3/00
U.S. Cl. 228—212 **20 Claims**

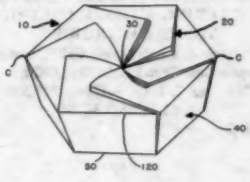


1. A jig employed to precisely position a metal attachment contiguous to a metallic crown as used by dentists for restorations and the like, this jig retaining said attachment prior to and during the soldering of the attachment to the crown, this jig including:
(a) a precisely formed head means sized and shaped to receive and retain the metal attachment having a selected engaging configuration;
(b) an integral tailpiece portion of said jig adapted for retention in an investment of relatively fireproof material adapted to retain said crown and the tailpiece portion of the jig; said jig being adapted to maintain said crown and attachment in a contiguous relationship prior to and during the soldering of the attachment to said crown.

4,930,680
ONE PIECE CONTAINER WITH FOLDABLE TOP CLOSURE AND BLANK THEREFORE

John P. Hanus, 3509 N. 64th St., Milwaukee, Wis. 53216

Filed Jul. 14, 1989, Ser. No. 380,149
Int. Cl.[5] B65D 5/24
U.S. Cl. 229—110 **10 Claims**

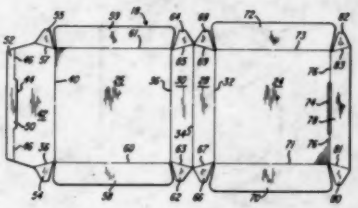


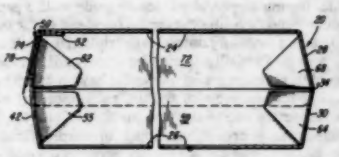
1. A blank sheet of material having a multiplicity of scored lines which divide said sheet into a multiplicity of panels permitting said sheet to be folded along said scored lines into a container, said panels being arranged into groupings of panels including:
(a) center shape having at least four sides;
(b) a first group comprising a plurality of polygonal shaped panels essentially circumscribing said center shape, said first group including a plurality of quadrangles each sharing a common scored line with said center shape, said quadrangles separated by at least two triangles which share respective common scored lines with said quadrangles; and
(c) a second group of polygonal shapes essentially circumscribing said first group and having sides which collectively form an outer periphery of said blank, said second group including:
(i) a plurality of first members each sharing a common scored line with a first side of said quadrangles and each having an other side coextensive with a line extending outwardly from a second side of said quadrangles,
(ii) a triangularly shaped member associated with each of said first members and comprising a pair of sides diverging from a point of intersection, one of said pair of sides being common to a side of an adjacent first member and the other of said pair of sides being coextensive with a line extending outwardly from a third side of said quadrangles, and
(iii) at least two second members, one having a common scored line with an adjacent triangularly shaped member and a common scored line with an adjacent triangle and the other having a common scored line with an associated first member and a common scored line with an adjacent triangle.

4,930,681
AUTOMATIC LATCHING CONTAINER HAVING GOOD THERMAL INSULATION

Clinton Fultz, 5317 O'Neall Rd., Waynesville, Ohio 45068, and Stanley Dalton, 10190 Mudlick Rd., Germantown, Ohio 45327

Filed Aug. 18, 1988, Ser. No. 233,224
Int. Cl.[5] B65D 5/20
U.S. Cl. 229—114 **7 Claims**





1. A container of semi-rigid paper-like material, comprising an upper panel, a lower panel,
a first pair of side walls, the first pair of side walls being attached to the upper panel at opposite portions thereof, a pair of first end walls, the first end walls being attached to the upper panel at opposite portions thereof, there being an opening partially separating one of said first end walls from the upper panel, said opening being within said first end wall and within an adjacent part of the upper panel, the upper panel and said first end walls and said first side walls attached thereto forming a cover member of the container,
a pair of second side walls, the second side walls being attached to the lower panel at opposite portions thereof, a pair of second end walls, the second end walls being

attached to the lower panel at opposite portions thereof, one of said second end walls including a pivotal flap, the lower panel and said walls attached thereto forming a body member of the container,

the upper panel being in covering relationship upon the lower panel as said side walls of the upper panel at least partially cover said side walls of the lower panel, said first end wall of the upper panel which has said opening therein covering said second end wall of the lower panel which includes said pivotal flap, said pivotal flap of said second end wall extending into said opening which partially separates said first end wall and said upper panel, whereby said flap within said opening latchably attaches said first end wall to said second end wall, whereby the cover member is latched in covering relationship to the body member of the container, said opening which partially separates the upper panel and said first end wall providing an aperture within which said flap can be readily pivotally moved for withdrawal of said flap from said opening and from said first end wall of the upper panel for unlatching the cover member from the body member of the container.

4,930,682

RECLOSEABLE LID CONSTRUCTION FOR A PAPERBOARD CONTAINER

Robert L. Gordon, Monroe; Robert E. Rehm, Chester, and Robert Sosnowski, Monroe, all of N.Y., assignors to International Paper Company, Purchase, N.Y.

Filed Dec. 15, 1989, Ser. No. 450,938

Int. Cl.[5] B65D *5/54*

U.S. Cl. 229—123.3 **7 Claims**

1. A recloseable lid construction for an annular paperboard container having a vertically extending side wall, a paperboard lid spanning and covering the upper, open end of the container, said lid having a radially outermost peripherial portion, said lid having a pair of radially spaced microcuts adjacent at least a portion of its periphery, said microcuts having a depth of about one half of the thickness of the lid, each microcut extending from a respective one of the two surfaces of said lid, the radially outermost microcut extending upwardly from the lid bottom surface, said lid having its peripheral edge bent upwardly, an integral lifting tab projecting outwardly from said peripheral edge, the upper portion of said side wall having an inward bend of about 180 degrees to form a fold over strip to sandwich the upwardly bent edge of the lid, a cut out segment on the fold over strip aligned with said lifting tab, the end of the tab projecting beyond the upper edge of the container, the uppermost portion of said fold over strip being substantially parallel to said side wall, the lower portion of said fold over strip being tilted radially inwardly to define a latching strip portion whose lower end extends radially inwardly of the radially outermost microcut, whereby opening of the container is effected upon pulling the lifting tab up, the tab separating from the lid radially outermost portion, the lid rips along the lid microcuts and is displaced upwardly to define a dispensing opening and to permit dispensing of any contents of the container, and whereby the lid is reclosed by pushing its displaced portion back to substantially its original horizontal position, whereby the tilted latching strip effects a snap reclosure for the lid, and whereby a radially inwardly extending shelf is formed by the spaced microcuts upon lid lifting, the shelf serving as an abutment to limit the extent of reclosure of the lid.

4,930,683

PARALLELEPIPEDAL FLAT GABLED PACKAGE AND METHOD OF MANUFACTURE

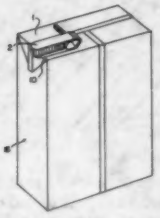
Jürgen Färber, Kaarst, Fed. Rep. of Germany, assignor to PKL Verpackungssysteme GmbH, Dusseldorf, Fed. Rep. of Germany

Filed Feb. 28, 1989, Ser. No. 317,228

Claims priority, application Fed. Rep. of Germany, Mar. 12, 1988, 3808303

Int. Cl.[5] B65D *5/74*

U.S. Cl. 229—125.09 **23 Claims**



1. In a parallelepipedal flat-gabled package, such as an eared package, having a medial seam, an area in the gable that has been prepared such that it can be penetrated or separated along a closed curve and, once it has been penetrated or separated, will constitute a pouring hole, a plastic pour-out structure that has a flange surrounding the pouring hole, rigidly secured to the outer surface of the gable, and into the spout of which can be axially inserted a tube with a circumference that matches the closed curve and a number of triangular teeth along the surface that faces the pouring hole, and a cap that can be repeatedly employed to close the spout, the inner surface of the package being coated with a hot-adhering film of plastic, the improvement wherein the closure-flap cap is securely attached to the tube and is articulated to the tab on the pour-out structure, which is in the form of a spout.

4,930,684

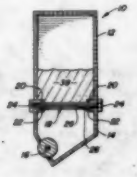
CLOSURE STRIP AND METHOD FOR REMANUFACTURING A TONER CARTRIDGE AND TONER CARTRIDGE

Laurence O. Patterson, Chatsworth, Calif., assignor to Data Products Corporation, Woodland Hills, Calif.

Filed Aug. 2, 1988, Ser. No. 227,300

Int. Cl.[5] B65D *88/54*

U.S. Cl. 222—325 **14 Claims**



1. A reusable toner-proof closure strip for sliding insertion/removal in a toner cartridge having

a toner container section having a container lip,

a hopper section having a hopper lip abutting the container lip to form a pair of opposed channels within the toner cartridge,

each of the channels having a container lip wall, a hopper lip wall, and a bottom wall, and

an access slit in the cartridge; said closure strip comprising:

a firm substrate strip of a width slightly less than the distance between the bottom walls of the opposed channels, of a thickness less than the distance between the container lip wall and the hopper lip wall of each channel, and of a length sufficient to sealingly abut the container lip during insertion in the slit while leaving a tab portion outside the slit; and

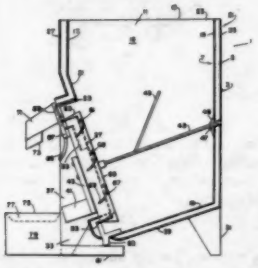
resilient sealing means attached to one face of the substrate strip for making the closure strip fit snugly between the bottom walls of the channels and snugly between the container lip wall and the hopper lip wall of each channel.

4,930,685

ICE DISPENSING APPARATUS AND METHOD

Jerry L. Landers, Jeffersonville, Ind., assignor to SerVend International, Inc., Jeffersonville, Ind.

Filed Feb. 26, 1988, Ser. No. 160,753
Int. Cl.[5] G01F *11/10*
U.S. Cl. 222—370 **47 Claims**



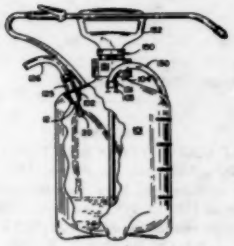
1. An ice dispensing paddle wheel comprising a shaft, circular means connected to the shaft for supporting peripheral means, peripheral means connected to a circumference of the circular means for supporting ice-moving means, and ice-moving means connected to the peripheral means and extending outward therefrom, the ice-moving means comprising ice-moving blades connected to the peripheral means and being positioned at angles relative to the shaft, wherein the blades extend in curved surfaces which curve generally rearwardly with respect to shaft rotation and then axially with respect to the shaft, whereby the paddles urge the ice to move forwardly in the direction of shaft rotation and in front of the blades and urge the ice to move axially forwardly with respect to the shaft as the shaft, circular means, peripheral means and ice-moving blades move, wherein the circular means comprises a circular plate and wherein the peripheral means comprises a truncated conical plate attached to and extending forward of a circumferential area of the circular plate, and wherein the blades are attached to the truncated conical plate and wherein the blades curve rearward in a direction of rotation of the circular plate and axially, wherein the circular plate fits against a circular portion of a front wall of an ice dispenser bin, wherein the conical plate surrounds a cylindrical wall portion of a recess in the front wall of the ice dispenser bin and wherein the blades move within the recess.

4,930,686

SELF-PRESSURIZING SPRAYER HAVING INLET PRESSURE RESPONSIVE VALVE

Garry L. Ellison, Grand Rapids, Mich., assignor to Root-Lowell Manufacturing Company, Lowell, Mich.

Continuation-in-part of Ser. No. 204,625, Jun. 9, 1988, which is a continuation-in-part of Ser. No. 58,519, Jun. 5, 1987, Pat. No. 4,782,982, which is a continuation-in-part of Ser. No. 3,469, Jan. 15, 1987, abandoned. This application Dec. 21, 1988, Ser. No. 287,123
The portion of the term of this patent subsequent to Nov. 8, 2005, has been disclaimed.
Int. Cl.[5] B65D *83/14*; B05B *9/04*
U.S. Cl. 222—394 **23 Claims**



1. A portable sprayer apparatus for dispensing liquids under pressure comprising:

a closed receptacle for containing liquids under pressure, said receptacle including a dispensing outlet operably connected to dispensing valve means which can be opened to dispense liquid under pressure or closed to seal said container;

a pressure responsive filling valve means extending through wall of said receptacle for admitting liquid to the interior of said receptacle from an external source of liquid, said valve means being responsive to the pressure of said source and the pressure within said receptacle to close when said pressure of said source exceeds a predetermined value and when said pressure within said receptacle exceeds said pressure of said source whereby said valve will close when the source is disconnected from the receptacle after filling thereof and if it is attempted to fill the receptacle from a source having an undesirably high source pressure.

4,930,687

DECANTER WITH ATTACHED SPOUT-HANDLE AND METHOD OF MAKING SAME

Dieter Brindöpke, Minden, and Heiko Rieken, Bad Salzuflen, both of Fed. Rep. of Germany, assignors to Melitta-Werke Bentz & Sohn, Minden, Fed. Rep. of Germany

Filed Nov. 22, 1988, Ser. No. 274,818
Int. Cl.[5] A47G *19/14*
U.S. Cl. 222—475.1 **17 Claims**

1. A decanter with attached spout-handle comprising a glass carafe having a neck portion with an upstanding ledge providing an opening thereto, a spout-handle having an annular cavity loosely receiving the ledge of the carafe therein, a plurality

of separate attachment means secured and entirely received within the cavity of the spout-handle and each extending about

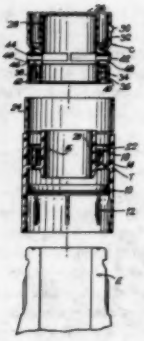
and engaging the ledge of the carafe for interlocking and securing the spout-handle with the carafe.

4,930,688

CAP FOR BOTTLES AND THE LIKE

Adriano G. Arona-Delonghi, Monterrey, Mexico, assignor to Fabricacion de Maquinas, S.A., Monterrey, Mexico

Filed Feb. 15, 1989, Ser. No. 311,465
Claims priority, application Mexico, Feb. 15, 1988, 10411
Int. Cl.[5] B67D *3/00, 47/00*
U.S. Cl. 222—484 **11 Claims**



1. A cap for bottles and the like comprising:

(a) a retention member body for coupling hermetically to the mouth of a bottle having, in one end,

(i) a plurality of vertical, relatively flexible fastening ribs which lock against the edge of the neck of the bottle to prevent the cap from sliding upwardly and a plurality of internal vertical locking legs which hold the cap on the edge of the neck of the bottle and prevent the cap from turning about the bottle,

(ii) a first annular wall attached to the internal part of the retention member body which serves as a seat on top of the mouth of the bottle,

(iii) a second annular wall, which acts as a guide, attached to the internal part of the mouth of the bottle and disposed perpendicularly to said first annular wall, and

(iv) a first coupling means located between the second annular wall and the internal part of the retention member body;

(b) a cover comprising,

(i) a top cap for covering an exit orifice of the bottle which is inserted into said retention member body,

(ii) at least one tubular wall coupled to an upper portion of the top cover to guide the cover internally in said second annular wall,

(iii) a fourth annular wall attached to the lower end of said at least one tubular wall,

(iv) at least one transverse orifice in said fourth annular wall to permit the passage of the contents of the bottle,

(v) a second coupling means located on the lower part of said fourth annular wall which is interconnected with the first coupling means of the retention member body whereby when the cover is advanced by an upward movement the contents of the bottle can exit through said orifices and when the cover is retracted by a downward movement the orifices are closed, and

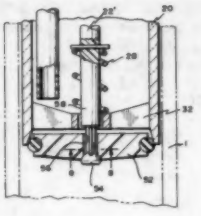
(vi) a fourth tubular wall located at the lower part of the fourth annular wall being attached to the internal part of said retention member to prevent the removal of the cap from said retention member body.

4,930,689

RESEALABLE CAP FOR A CONTAINER

Thomas R. Stumpf, 615 Showers St., Harrisburg, Pa. 17104

Filed Feb. 28, 1989, Ser. No. 316,883
Int. Cl.[5] B67D *3/00*
U.S. Cl. 222—487 **2 Claims**



1. A resealable cap for a container, comprising:

an insert member adapted to be inserted into an opening in said container, defining a passage from the interior to the exterior of the container;

valve means for closing the passage, said valve means having;

(a) a sealing member, having an opening therethrough surrounded by a rim and having an edge substantially contiguous with the edge of said passage;

(b) an elongated member disposed within said insert member, having a first end having a tip attached to said elongated member by a reduced diameter portion, said tip and said reduced diameter portion being configured to permit said reduced diameter portion to pass through said opening in said sealing member; said first end of said elongated member and said opening in said sealing member being configurated to co-act with said tip to form a seal around the rim of said opening in said sealing member when said elongated member is urged away from the interior of said container; said first end of said elongated member and said opening in said sealing member being shaped to define a gas passage in the space between said narrow portion and the rim of said opening in said sealing member when said elongated member is pushed a predetermined distance toward the interior of said container; said elongated member adapted to engage and push said sealing member toward the interior of said container when said elongated member is pushed toward the interior of said container more than a predetermined distance, thereby separating said substantially contiguous edge of said sealing member from said insert member; said elongated member having a second end disposed external to said container and said insert member;

(c) biasing means adapted to urge said elongated member and sealing means away from the interior of said container to effect a seal between the interior of said container;

said valve means being configured for opening said seal by application of a mechanical force against said elongated member in a direction opposite that of said biasing means; and

body means adapted to removably attach said insert member to said container, said body means comprising a pour spout and means for air replacement within said container.

4,930,690

CONTAINER AND TEAT FEEDING ASSEMBLY

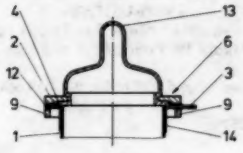
Corinne Angeloz, Thun; Peter Huerlimann, Konolfingen, and Eugene Van Meir, Fribourg, all of Switzerland, assignors to Nestec S.A., Vevey, Switzerland

Filed Dec. 7, 1988, Ser. No. 281,086

Claims priority, application European Pat. Off., Sep. 7, 1988, 88114545.2

Int. Cl.[5] A61J 9/00

U.S. Cl. 222—490 **14 Claims**



1. A container and teat feeding assembly comprising:

a container having:

(i) a base integral with lateral walls reinforced with a cover foil extending from the base to an edge defining an upper open end;

(ii) a rim integral with and having upper and lower surfaces extending to a rim edge away from the open end edge of the lateral walls in a plane parallel with a plane of the open end of the container defined by the edge of the lateral walls; and

(iii) at least three projections integral with the rim extending from the rim edge away from the open end;

a teat having a base seated on the rim of the container; and

a locking ring having:

(i) a ring lip abutting the upper surface of the rim extending from the open end edge to a lip edge beyond the rim edge away from the open end and having a groove at the open end edge for accommodating and securing the base of the teat within the groove between the lip and the upper surface of the rim;

(ii) a ring skirt integral with and extending perpendicularly from the lip edge about the rim edge and having a recess for accommodating the rim projections; and

(iii) lugs integral with and extending perpendicularly from the skirt towards the lateral walls corresponding in number with the container rim projections and configured and positioned for, together with the recess, locking engagement with the rim projections.

4,930,691

PNEUMATIC DOSIMETER

Bernt Nagell, Haugesund, Norway, assignor to Norsk Hydro a.s., Oslo, Norway

Filed Oct. 11, 1988, Ser. No. 255,269

Claims priority, application Norway, Oct. 9, 1987, 874220

Int. Cl.[5] B65G 69/06; B05B 7/00

U.S. Cl. 222—630 **22 Claims**

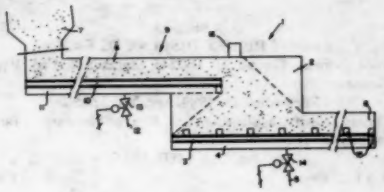
12. A dosimeter for providing measured discrete doses of pulverulent material, comprising:

a vessel having an upper chamber with an inlet and an outlet;

a channel connected at a first end to said inlet;

supply means, connected to a second end of said channel, for supplying pulverulent material to said channel;

feed means for feeding said pulverulent material from said channel, through said inlet and into said upper chamber until such time as said pulverulent material backs up in



said upper chamber to block said inlet with an amount of said pulverulent material which defines a predetermined dose; and

discharge means for discharging substantially all of said pulverulent matrerial through said outlet to dispense said predetermined dose.

4,930,692

BELT HANGER

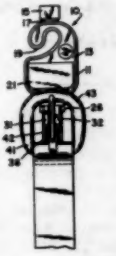
George Smilow, San Diego, Calif., and Samuel L. Kayen, Elmont, N.Y., assignors to B&G Plastics, Inc., New York, N.Y.

Continuation of Ser. No. 412,865, Aug. 30, 1982, Pat. No. 4,453,655. This application Apr. 26, 1984, Ser. No. 604,087

The portion of the term of this patent subsequent to Jun. 12, 2001, has been disclaimed.

Int. Cl.[5] A47G 25/36

U.S. Cl. 223—85 **5 Claims**



1. A hanger for supporting a belt for display, said belt including buckle of type having an open frame with one course thereof supporting a prong for pivotal movement into engagement with a second course of said buckle frame, said hanger being elongate and comprising:

(a) a main body portion defining a hook for receipt of a display rod; and

(b) buckle-engaging means connected with said main body portion for receiving and releasably retaining said buckle, said buckle-engaging means having

(1) length and width of dimensions suited for insertion of said buckle-engaging means in said frame,

(2) an exterior surface for supporting said prong-abutting course of said frame upon such insertion in said frame,

(3) a channel extending into said exterior surface for receiving said buckle prong by pivotal movement thereof about said prong-supporting course of said frame into engagement with said prong-abutting frame course while said prong-supporting course is supported on said

exterior surface, said channel being configured for arresting reverse pivotal movement of said prong from such disposition in said channel, and

(4) a configuration for providing direct viewability of the free end of said prong while said prong is in engagement with said prong-abutting course.

4,930,693

BODY RELIEF DISPLAY DEVICE

Kerstin Schwab, Gwand 1a, D-7245 Starzach 1, Fed. Rep. of Germany

Filed Mar. 14, 1989, Ser. No. 323,503

Claims priority, application Fed. Rep. of Germany, Mar. 24, 1988, 8804003[U]

Int. Cl.[5] A41H *5/00*

U.S. Cl. 223—66 7 Claims

1. A body relief display device comprising

a first torso form shaped as a relief of a body part and including a first outer contour,

a second torso form shaped as a relief of a body part and including a second outer contour, said second torso form being substantially identical to said first torso form, and

a flat surface formed as an extension of said second outer contour,

said first torso form being fitted on top of said second torso form.

4,930,694

DEVICE MOUNTING APPLIANCE

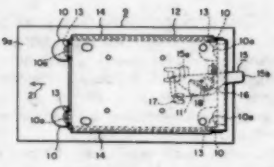
Kunitoshi Yoshitake; Yoshihiro Tsujita, and Nobuyuki Kakuta, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 13, 1989, Ser. No. 365,303

Claims priority, application Japan, Jun. 14, 1988, 63-14[illegible]31

Int. Cl.[5] B60R *11/00*

U.S. Cl. 224—42.45 R 4 Claims



1. A device mounting appliance comprising a device and a mounting appliance, said device mounting appliance including:

at least three combined leg-lugs formed on a mounting surface of the device;

recesses formed in said combined leg-lugs, respectively;

a fixing lug formed on the mounting surface of the device so as to be positioned within a polygon formed by connecting the combined leg-lugs;

a movable lever attached to the mounting appliance, said lever having a hook portion and a wobbling preventing projection;

a spring for urging the lever in one direction; and

guide means provided on the mounting appliance and engaged with lugs of the appliance which are fitted into the recesses of said combined leg-lugs when the device on the mounting appliance is slid a predetermined distance, and also engaged with the combined leg-lugs upon sliding of the device

wherein when the device on the mounting appliance is slid, said lever is moved once by said fixing lug of the device against said spring and then, at the end of the sliding motion, the lever is returned by the spring, allowing said hook portion to grip the fixing lug substantially in the sliding direction, and at the same time said wobbling preventing projection of the lever is brought into pressure contact with the fixing lug.

4,930,695

SUPPORT SYSTEM FOR GUITAR OR LIKE INSTRUMENT

Jerry R. Thompson, 8060 Niwot Rd. #263, Longmont, Colo. 80501, and Martin W. Peters, 6292 Arapahoe #3, Boulder, Colo. 80303

Filed Mar. 6, 1989, Ser. No. 319,564

Int. Cl.[5] A45F *5/00*

U.S. Cl. 224—257 3 Claims

1. A harness for supporting and stabilizing a guitar or banjo in front of a player, said guitar or banjo having first and second spaced anchor points, comprising:

a strap extending from said first anchor point upward over the shoulder proximate the first anchor point, down across the back, forward under the arm opposite the shoulder proximate the first anchor point, up over the shoulder opposite the shoulder proximate the first anchor point, down across the back, forward under the arm proximate the shoulder proximate the first anchor point, and forward to the first anchor point;

means for attaching said second anchor point to said strap at an intermediate point on said strap.

4,930,696

MOUNTING MEANS FOR VEHICLE AUDIO DEVICE

Michael VanAcker, Warren, Mich., assignor to Chrysler Corporation, Highland Park, Mich.

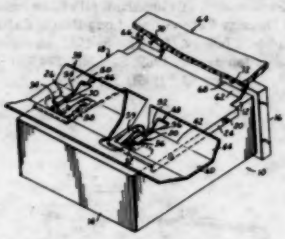
Filed Jul. 31, 1989, Ser. No. 386,667

Int. Cl.[5] B60R *11/02*

U.S. Cl. 224—42.45 R 5 Claims

1. Mounting means for securing a casing of an audio device to an instrument panel structure of a vehicle, the casing having an upper surface, an interior face, and an exterior face, the mounting means including a plate secured to the casing on the upper surface thereof, the plate having a pair of upwardly extending spaced apart tabs positioned adjacent to the interior face of the casing, each tab comprising a first upwardly extending portion and a second portion extending from an upper end of the first portion laterally of the casing, the instrument panel structure including a bracket comprising a first wall extending

generally horizontally and having a rearward edge, a second wall angled upwardly and extending from said rearward edge, the bracket including a pair of longitudinally extending slots spaced apart the same distance as the spacing of the tabs, each slot including a first enlarged portion formed in the upwardly angled wall of the bracket to permit passage of an entire tab upon insertion of the casing into the instrument panel structure, each slot including a second narrow portion formed in the horizontally extending wall of the bracket to permit longitudinal passage of the first upwardly extending portion of the tab but not downward passage of the second portion of the tab after the tab has been inserted into the slot, at least one spring



arm extending upwardly from the plate which is secured to the casing to make pressure contact with the bracket after the casing has been inserted into the instrumental panel structure to thereby secure the casing firmly in place, the plate which is secured to the casing having an upwardly angled wall portion adjacent the exterior face of the casing, the instrument panel structure having a downwardly angled wall portion positioned to contact the upwardly angled portion of the plate upon insertion of the casing into the instrumental panel structure, and fastening means to fixedly secure the upwardly angled portion of the plate to the downwardly angled wall portion of the instrumental panel structure to thereby fixedly secure the casing in place.

4,930,697

SHOPPING BASKET FOR USE WITH STROLLER

Takehiko Takahashi; Yoshiyasu Ishii, and Hiroaki Matsuda, all of Tokyo, Japan, assignors to Combi Co., Ltd., Tokyo, Japan

Filed Mar. 10, 1989, Ser. No. 321,816

Claims priority, application Japan, Sep. 13, 1988, 63-119348[U]

Int. Cl.[5] B62B 9/12

U.S. Cl. 224—275 **9 Claims**

1. A shopping basket adapted for use with a stroller which includes

a stroller body having a pair of front leg bars, a pair of rear leg bars, and a plurality of transverse foldable bars, said front legs and said rear legs being foldably connected together by said transverse foldable bars,

a seat portion attached to said stroller body, and

a backrest attached to said stroller body, said shopping basket comprising:

a basket body having a box-like body of a generally square cross-section made of a material which is easily foldable, said box-like body having such a size and depth as to be attached to the underside of said seat portion of said stroller and comprising upper open end portions, said upper open end portions having lateral sides;

a bottom plate fixedly secured at its peripheral margin to a lower end of said box-like body, said bottom plate being foldable into a plurality of distinct portions in the direction of the width of the stroller;

a holder mechanism for attachment to the underside of the seat portion, said holder mechanism having holder mechanism units, said holder mechanism units being fixedly mounted on said upper open end portions of said basket body, said holder mechanism units confront each other in the direction of the width of the stroller;

openable closure members secured respectively to upper half portions of rear corners of said basket body so as to allow a rear portion of said basket body to be freely opened; and

shape-retaining core elements mounted, respectively, on said lateral sides of said upper open end portion of said basket body, said shape-retaining core elements confront each other in the direction of the width of the stroller.

4,930,698

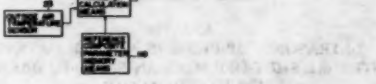
CONTROL APPARATUS FOR AUTOMOBILE AIR-CONDITIONERS

Yoriyuki Takekawa, and Hidekazu Oshizawa, both of Higashi, Japan, assignors to Diesel Kiki Co., Ltd., Tokyo, Japan

Filed Jun. 6, 1989, Ser. No. 361,862

Int. Cl.[5] B60H 3/00

U.S. Cl. 236—49.3 **2 Claims**



1. An apparatus for controlling an automobile air-conditioner, comprising:

(a) a temperature setter for setting a temperature;

(b) a vehicle compartment temperature sensor for detecting a temperature in a vehicle compartment;

(c) an outside air temperature sensor for detecting a temperature of air outside the vehicle compartment;

(d) control means for controlling operation of a component of the air-conditioner based on calculated control data;

(e) reference composite parameter memory means for storing composite parameters experimentally obtained with respect to a plurality of representative vehicle compartment temperatures and a plurality of representative outside air temperatures;

(f) composite parameter calculation means for calculating composite parameters corresponding to output values from said vehicle compartment temperature sensor and said outside air temperature sensor by interpolating the composite parameters stored in said reference composite parameter memory means based on the output values from said sensors;

(g) target discharge air temperature calculation means for calculating a desired temperature of discharge air based on a result of calculation by said composite parameter calculation means and an output value from said temperature setter; and

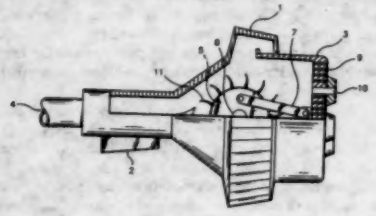
(h) control data calculation means for calculating control data for controlling the component of the air-conditioner, based on a result of calculation by said target discharge air calculation means.

4,930,699

COMBINED HAND SPRAY AND MASSAGER

Richard Wall, 18808 Hardt Rd., Glencoe, Mo. 63038

Filed Apr. 24, 1989, Ser. No. 341,959
Int. Cl.[5] B05B 3/16
U.S. Cl. 239—102.1 1 Claim



1. A hand held water spray fixture adapted to be coupled to a standard sink water faucet by a flexible hose wherein the improvement comprises:

a. the spray fixture having a vibratory face with water exiting orifices;

b. the vibratory face having an in and out vibratory movement;

c. the spray fixture incorporating an enclosed turbine wheel driven by the water flow though the spray fixture;

d. a crankshaft coupling the turbine wheel to the movable vibratory face; and,

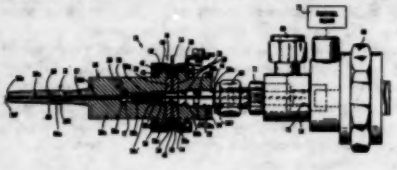
e. the vibratory face having at least one protuding water nozzle surrounded by a plurality of small orifices for passage of water for forming the controlled spray pattern.

4,930,700

ULTRASONIC DISPERSION NOZZLE HAVING INTERNAL SHUT-OFF MECHANISM WITH BARRIER FLUID SEPARATION

Clem S. McKown, Lake Hopatcong, N.J., assignor to Atochem North America, Woodbridge, N.J.

Continuation-in-part of Ser. No. 900,931, Aug. 27, 1986, abandoned. This application Oct. 19, 1988, Ser. No. 260,096
Int. Cl.[5] B05B 3/14
U.S. Cl. 239—102.2 9 Claims



1. An ultrasonic nozzle comprising:

an atomizing surface for producing an atomized liquid;

a liquid feed passageway having an inlet supplied with a process liquid at a first pressure and an outlet for supplying said process liquid to said atomizing surface, said passageway having a first section with a first diameter and a second fluidly connected section with a second, smaller diameter, with a shoulder defined between said first and second sections of said passageway;

vibration means for suplying atomizing vibrations to said atomizing surface at an ultrasonic frequency;

internal shut-off rod means positioned within said passageway and cooperating with said shoulder for preventing said supply of process liquid to said atomizing surface;

control means for controlling said internal shut-off rod means to prevent said supply of process liquid to said atomizing surface; and

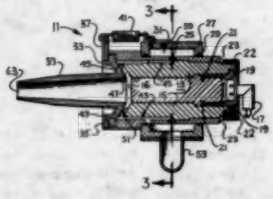
barrier fluid means positioned between said control means and said liquid feed passageway for providing a barrier fluid at a second pressure higher than said first pressure.

4,930,701

CONFLUENT NOZZLE

Eshmal L. Porter, St. Louis County; Walter E. Wozniak, and Gerald D. Garner, both of Florissant, all of Mo., assignors to McDonnell Douglas Corporation, Long Beach, Calif.

Continuation of Ser. No. 94,240, Sep. 8, 1987, abandoned. This application Jan. 3, 1989, Ser. No. 294,950
Int. Cl.[5] B05B 3/14
U.S. Cl. 239—102.2 4 Claims



1. A nozzle comprising:

an annular manifold;

a tubular casing that abuts the inner diameter of said manifold and is concentric with respect to said manifold;

an annular passageway that is concentric with said manifold and is located within said casing;

said annular passageway being comprised of an axial section which lies parallel to the centerline of said nozzle and a radial section which runs radially inward towards the centerline of said nozzle;

radial parts communicating said axial section communicating with said manifold;

a hollow cone having an opening formed from a truncated vertex and having an open base;

said radial section communicating with said base of said cone; and

said annular passageway causing fluid flowing through said annular passageway to change direction by more than 90 degrees, and directing such fluid radially inward so that a confluence of fluid flow occurs within said nozzle.

4,930,702

DETACHABLE CHEMICAL SPRAYER

John A. Vanderjagt, Memphis, Tenn., assignor to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Division of Ser. No. 96,621, Sep. 14, 1987, Pat. No. 4,826,083, which is a continuation-in-part of Ser. No. 939,679, Dec. 8, 1986, abandoned. This application Dec. 16, 1988, Ser. No. 285,865
Int. Cl.[5] B05B 9/06
U.S. Cl. 239—157 6 Claims

6. In combination with a tractor, a chemical sprayer for spraying a liquid chemical onto a field, as said chemical sprayer is moved over the field, said chemical sprayer comprising:

(a) frame means;

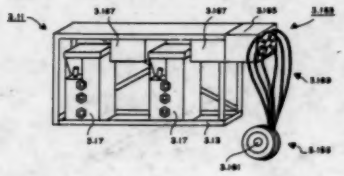
(b) cartridge means mounted on said frame means for holding a quantity of chemicals to be sprayed;

(c) means mounting said frame means on said tractor for converting said tractor to a sprayer and for carrying said

chemical sprayer over the field, said frame means and said cartridge means being supported by said tractor;

(d) sensing means for sensing the speed at which said chemical sprayer is moving over the field; and

(e) overall drive means operatively coupled to said sensing means and to said cartridge means for varying the output of said cartridge means in proportion to the speed at which said chemical sprayer is being moved over the field, said chemical sprayer including an elongated manifold means, at least one nozzle member mounted on said manifold means for allowing a fluid mixture to be sprayed therethrough from the interior of said manifold means, a water tank for holding a quantity of water to be sprayed from said nozzle member, water pump means operatively coupled to manifold means and to said water tank for pumping the water from said water tank into said manifold means adjacent said nozzle member; chemical pump means operatively coupled to said cartridge means and operatively coupled to said manifold means for pumping the chemicals from said cartridge means into said manifold means adjacent said nozzle member.

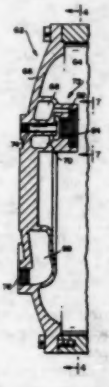


4,930,703

INTEGRAL FUEL NOZZLE COVER FOR GAS TURBINE COMBUSTOR

John E. Ford, Schenectady, and Albert Myers, Amsterdam, both of N.Y., assignors to General Electric Company

Filed Dec. 22, 1988, Ser. No. 288,393
Int. Cl.[5] F23L *1/00*; B05B *7/06*
U.S. Cl. 239—424 **10 Claims**



6. A nozzle cover for a combustor of a gas turbine engine comprising:

a one-piece integral part;

said one-piece integral part including at least first and second manifolds;

at least one nozzle holder in said one-piece integral part;

said first and second manifolds including means for supplying first and second gasses to said nozzle holder; and

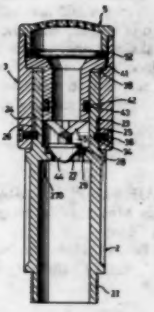
said nozzle cover having a generally concave shape as seen from inside said combustor.

4,930,704

FLOW CONTROLLABLE SPRAY NOZZLE

Teng C. Chen, No. 9, Lane 114, Ta Hsing St., Tainan City, Taiwan

Filed Aug. 1, 1988, Ser. No. 227,088
Int. Cl.[5] B05B *1/30*
U.S. Cl. 239—579 **9 Claims**



1. A flow controllable spray nozzle comprising an internally-threaded control ring having an inside diameter greater than an inside diameter of a cylindrical housing integrated thereunder, a hollow plunger with a radial flange disposed around an upper end thereof and a flow control means disposed thereunder, a nozzle cup with a threaded side wall screwable into said control ring, and a barrel having a handle section formed around a lower portion thereof and a threaded lower end for attachment to a standard supply pipe or hose;

the interior of said barrel being divided by a partition plate into two sections, an upper interior section and a lower interior section, said partition plate having a central hole formed therethrough and an annular shoulder around said central hole with a gasket received therein; said internally-threaded control ring having the inside diameter greater than the inside diameter of said cylindrical housing and forming a shoulder therebetween, said plunger being secured inside said housing with said radial flange abutting said shoulder by said nozzle cup screwing on said control ring so as to define a space therebetween complemental in shape and size to an upper portion of said barrel, an annular seal further provided between said nozzle cup and said radial flange to prevent leakage, another annular seal being disposed in a circumferential groove formed on an outside surface of said plunger to prevent the leakage between said plunger and said barrel;

said control ring together with said plunger and said flow control means, having been displaced on the upper portion of said barrel, being axially movable with respect to said barrel by means of an adjusting means to adjust the flow rate;

said adjusting means comprising a pair of helically-inclined slots symmetrically disposed around the outside surface of said barrel with the first end of the first helically-inclined slot slightly overlapped by the second end of the second helically-inclined slot and the first and of the second helically-inclined slot slightly overlapped by the second end of the first helically-inclined slot, and a pair of threaded holes diametrically symmetrical formed through said housing with, in order, a cup having the diameter thereof substantially the same as the width of the helically-inclined slots, a coil spring with one end thereof disposed in said cup, and a screw with a post projecting therefrom and encompassed by the other end of said coil spring

received in each of said threaded holes, said adjusting means being so disposed that when said screw is secured in said threaded holes on said housing, the reaction force of said spring pushes said cup into close engagement with and firmly against the corresponding helically-inclined slot and with the rotation of said control ring, said cups move along said helically-inclined slots so as to axially move said housing together with said plunger with respect to said barrel and thus adjust said flow control means and change the flow rate; and

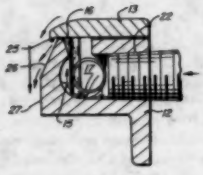
a pair of symmetrical vertical slots, a first vertical slot connecting the first end of said first helically-inclined slot and the second end of said second helically-inclined slot and a second vertical slot connecting the second end of said first helically-inclined slot and the first end of said second helically-inclined slot so that the plunger is vertically movable with said cups sliding along said vertical slots to interrupt the flow.

4,930,705

AIR FLOW APPARATUS

Steven E. Broerman, Mason, Ohio, assignor to Vortec Corporation, Cincinnati, Ohio

Filed Feb. 14, 1989, Ser. No. 310,741
Int. Cl.[5] B05B 1/04
U.S. Cl. 239—590.5 **12 Claims**



1. An apparatus for providing a thin, continuous film of jetting fluid, said apparatus comprising:

(a) An elongate body member defining: an elongate plenum chamber for receiving compressed fluid; inlet opening means for providing fluid communication between the plenum chamber and the outside of the body member, said plenum chamber receiving compressed fluid through said inlet opening means; and outlet opening means for providing fluid communication between the plenum chamber and the outside of the body member, said plenum chamber discharging the fluid through said outlet opening means, said outlet opening means restricting the flow of the fluid as it discharges;

(b) an elongate baffle disposed in the plenum chamber in unsecured relation to the body member, longitudinally of the plenum chamber, between the inlet opening means and the outlet opening means, for isolating turbulence in the fluid when the fluid enters the plenum chamber without restricting the flow of the fluid, said baffle moving against and engaging the body member in response to the force of the compressed fluid.

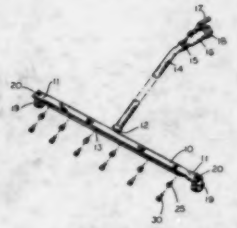
4,930,706

WATER BROOM

Arthur Merlin, 3300 W. Roxboro Rd., Atlanta, Ga. 30324

Filed Oct. 3, 1988, Ser. No. 252,157
Int. Cl.[5] B05B 1/20, 15/06; B08B 3/02
U.S. Cl. 239—754 **7 Claims**

1. A water spray apparatus comprising an elongated header of square tubing comprising four substantially flat walls and having ends which are crimped along a diagonal of the square to form generally flat end portions, said header having a plurality of apertures communicating between an interior and an exterior surface of one of said flat walls of said header; a tubular handle mounted to a flat wall of said header opposite said one wall in fluid communication with said header for grasping by an operator in an inclined attitude which usually orients the apertures downwardly toward the ground surface and the flat end portions of said header approximately parallel to the ground surface; a coupling means for coupling a water hose to said tubular handle; a wheel mounted to each of said flat end portions of said header and positioned below said flat end



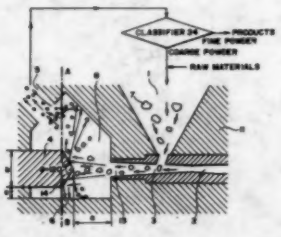
portion for movably supporting said header on the ground surface; and a nozzle mounted to said header in each of said header apertures, wherein each of said nozzles has a generally slot-shaped outlet for producing a generally flat fluid spray pattern, a resilient shank portion compressedly seated in said aperture, and a resilient flange portion that abuts in sealing engagement a peripheral portion of the interior surface of said one wall of said header about said aperture.

4,930,707

PNEUMATIC PULVERIZER AND PULVERIZING METHOD

Mayumi Oshiro, Tokyo; Toshiaki Sasaki, Abiko; Satoshi Mitsumura, Tokyo, and Masayoshi Kato, Iruma, all of, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 16, 1988, Ser. No. 271,917
Claims priority, application Japan, Nov. 18, 1987, 62-289638
Int. Cl.[5] B02C 19/06
U.S. Cl. 241—5 **27 Claims**



1. A pneumatic pulverizer comprising:

an accelerating pipe for conveying and accelerating powder by a high pressure gas;

a pulverizing chamber defined by wall portions which receives the powder from an accelerating pipe outlet of said accelerating pipe;

an impinging member, disposed in said pulverizing chamber opposite to said accelerating pipe outlet, for pulverizing the powder jetted out from said acceleration pipe outlet, said impinging member having a diameter and an impinging surface with a conically shaped tip portion with an apex angle between 110° and 175°, wherein

an inner diameter of said accelerating pipe outlet is smaller than the diameter of said impinging member, and said impinging member is disposed such that the shortest dis-

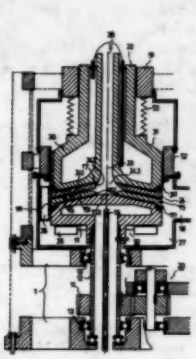
tance between said impinging member and said pulverizing chamber wall portions is 0.1 to 1 times the diameter of said impinging member, and wherein the powder is pulverized at said impinging surface of said impinging member and dispersed substantially in the entire circumferential direction of said impinging surface and the dispersed powder impinges secondarily on said wall portions of said pulverizing chamber.

4,930,708

GRINDING APPARATUS

Chi-Shiang Chen, No. 15, Chung-Shan Rd., Su-Ao Chen, Ilan Hsien, Taiwan

Filed Jun. 23, 1989, Ser. No. 370,685
Int. Cl.[5] B02C *7/08*
U.S. Cl. 241—65 6 Claims



1. A grinding apparatus comprising:

a supporting frame;

a driving means mounted in said frame;

an upper and a lower grinding member mounted coaxially on a vertical axis on said frame, one of said upper and lower grinding members being rotated by said driving means, said upper grinding member being movable in an upward and a downward direction, each of said upper and lower grinding members having a grinding disc with a central opening and a grinding surface, a disc seat holding each of said grinding discs, means for removably securing each of said grinding discs to respective of said disc seats, and respective shafts carrying each of said disc seats said grinding surface of said grinding disc of said upper grinding member being concave, said grinding surface of said grinding disc of said lower grinding member being convex so as to correspondingly come into contact with said grinding surface of said upper grinding member;

means for guiding said shaft of said upper grinding member, which permits said upper grinding member to move vertically but prevents the same from lateral movement; and a feeding channel formed through one of said grinding members which communicates with said central openings of said grinding discs.

4,930,709

CUTTER HEAD FOR CUTTERS

Michael Steffens, Remscheid, Fed. Rep. of Germany, assignor to G. Walter Steffens GmbH & Co., Remscheid, Fed. Rep. of Germany

Filed Aug. 30, 1988, Ser. No. 238,559
Claims priority, application Fed. Rep. of Germany, Sep. 24, 1987, 3732237
Int. Cl.[5] B02C *18/00*
U.S. Cl. 241—282.2 4 Claims

1. A cutter head comprising:

at least two blades, each blade having a blade portion and a root portion, such portions being integral with each other, said root portion having wall portions including facing inner parallel wall portions defining an elongate hole, and said parallel wall portions having teeth formed thereon; and

a mounting plate for each blade, each of said plates having two opposite parallel first edges with teeth formed thereon for engagement with the teeth of said parallel wall portions, and further having connection means to connect each of said plates for driving engagement with a drive shaft;

wherein the thickness of each of said mounting plates is not greater than the thickness of a respective blade root portion and the length of said

parallel wall portions is greater than the length of said first edges.

4,930,710

ROTARY CUTTER, PARTICULARLY FOR COMMINUTING PLASTIC MATERIAL

Hans Hench, Sonnhalde 31, D-7854 Inzlingen, Fed. Rep. of Germany

Filed May 10, 1989, Ser. No. 349,632
Int. Cl.[5] B02C *18/18*
U.S. Cl. 241—294 21 Claims

1. Rotary cutter, particularly for communicating plastic materials, having

a cylindrical body (1, 30, 33, 35, 100) having a plurality of essentially axially directed circumferentially uniformly distributed grooves (2) formed in the surface thereof,

wherein each groove (2) defines a first lateral support surface (13) and a second lateral support surface (5) extending to the circumference of the cylindrical body;

a plurality of axially elongated removable cutter elements (6, 6a, 6b, 6c) and having a radially inwardly extending portion (10) extending into a respective groove; and

a plurality of elongated clamping elements (7, 7') located in the respective grooves for clamping the cutter elements therein,

wherein

said cutter elements (6, 6a, 6b, 6c) define a first engagement surface facing one (13) of said support surfaces (5, 13) of the groove, a second engagement surface (11) facing the other (5) of said support surfaces of the groove (2) and a third support surface (5a; 5b);

at least part of said first lateral support surface (13) of the groove (2) and at least part of the engagement surface (12) of the cutter element (6, 6a, 6b, 6c) forming, in cross section, a wedge-shaped space which decreases in width towards the circumference of the cylindrical body (1, 30, 31, 33, 35, 100) and which opens into the circumference of the cylindrical body;

each clamping element (7, 7') defines a clamping surface facing said first engagement surface (12) of the cutter element, and

wherein each clamping element (7, 7') in cross section is wedge-shaped and dimenrioned and shaped to fit in said wedge-shaped space and to extend substantially to the circumference of said cylindrical body;

clamping means (16, 17, 18, 20, 22, 22; 51) are provided located in the groove (2) and acting radially outwardly on the clamping elements (7, 7') for providing a radially outwardly directed clamping force to press the clamping element radially outwardly and support the clamping element between said first lateral support surface (13) of the groove (2) and against said engagement surface (12) of the cutter element, whereby the cutter element will be clamped into position in said wedge-shaped space which decreases in width towards the circumference of the cylindrical body and the clamping force will increase upon rotation of the cutter element due to centrifugal force;

wherein said radially inwardly extending portions of the cutter elements have a cross section which tapers, or is wedge-shaped with decreasing width in the direction of the circumference of the cylindrical body and which have a maximum width which is smaller than the width of the groove (2) at its open end at the circumference of the cylindrical body; and

wherein the cylindrical body is formed with abutment surface means (14, 140) for engagement with the third support surface (5a) on the cutter elements (5b) for determining the radial position of the cutter elements on the cutter in a radially inwardly extending direction and independently of any cutting edges on said cutter elements.

4,930,711

AUTOMATIC DEFECT CUTTING ASSEMBLY FOR A CONTINUOUS FABRIC WINDER

Nicholas L. Morizzo, Newport Richey, Fla., assignor to Krantz America, Inc., Charlotte, N.C.

Filed Jan. 17, 1989, Ser. No. 297,425
Int. Cl.[5] B65H *19/26*
U.S. Cl. 242—56 R **19 Claims**

1. In a method of winding a traveling sheet of continuous-length material onto a supporting roll, a method for severing and removing a section of the sheet and thereafter continuing to wind the following length of the sheet on the roll, comprising:

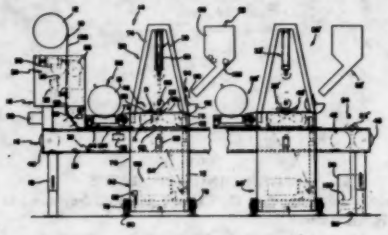
feeding the sheet, including a length preceding the section to be removed, along a predetermined path of the roll;

when a leading portion of the section to be removed advances to a predetermined cutting location along the path and while continuing the feeding movement thereof along the path, transversely cutting the sheet at the leading portion of the section to be removed to sever the preceding length of the sheet of material from the section to be removed;

thereafter temporarily ceasing the feeding of the preceding length of the sheet along the path and suctioning a portion of the preceding length of the sheet to temporarily displace the preceding length portion from the path;

advancing the section to be removed and the following length of the sheet of material along the path;

when a trailing portion of the section to be removed is advanced to the cutting location and while continuing the feeding movement thereof along the path, transversely cutting the trailing portion of the section to be removed to



sever the section to be removed from the following length of the sheet of material;

advancing the severed section to be removed along the path to a discharge position;

advancing the following length of the sheet of material along the path to the location of suctioning of the preceding length of the sheet of material;

thereupon discontinuing the suctioning of the preceding length portion to return the preceding length portion to the path in overlapping relation to the following length of the sheet of material; and

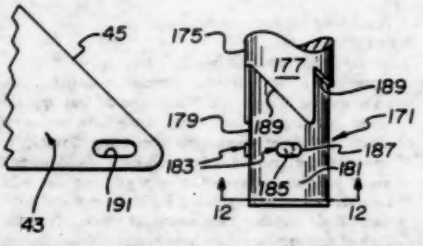
resuming the feeding of the preceding and following lengths of the sheet of material along the path to the roll.

4,930,712

FILM TAKE-UP SPOOL

David C. Smart, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed May 9, 1989, Ser. No. 349,477
Int. Cl.[5] G03B *17/26*
U.S. Cl. 242—74 **4 Claims**



1. A take-up spool for winding elastic material in the form of a filmstrip comprising a cylindrically-shaped major core portion having an outer peripheral surface for supporting the filmstrip, a minor core portion arranged coaxially with respect to said major core portion and having an outer peripheral surface located radially inward of said outer peripheral surface of the major core portion, and a plurality of film catching members projecting from the outer peripheral surface of said minor core portion, characterized in that:

a series of film guiding surfaces equal in number to the number of said film catching members extend radially between the outer peripheral surface of said major core

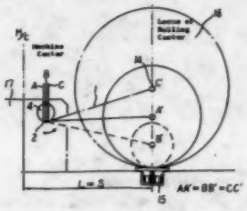
portion and the outer peripheral surface of said minor core portion, each of said film guiding surfaces being inclined at substantially the same angle as a tapered leading end of the filmstrip to guide the filmstrip toward one of said film catching members.

4,930,713

MILL ROLL STAND

Hiroshi Sato, and Eiichi Shimizu, both of Hiroshima, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 10, 1989, Ser. No. 321,872
Int. Cl.[5] B65H *16/06, 19/30*
U.S. Cl. 242—58.6 1 Claim



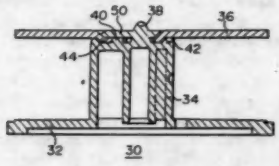
1. A mill roll stand in a feeding apparatus of a rolled sheet, including at least one pair of arms having rolling centers at their tip ends and constructed so as to be swingable about an arm shaft at their base ends and so as to be movable along said arm shaft to approach to or separate from each other; characterized in that the opposite ends of said arm shaft are eccentrically and pivotably supported from rotary supports on a frame of said mill roll stand, and that there is provided converter means for converting the swinging locus of said rolling center into a locus along a vertical straight line, wherein said converter means includes a bracket mounted to said arm shaft, a cylinder device pivotably connected to one end of said bracket, and members for guiding the other end of said bracket in the vertical direction.

4,930,714

REEL FOR A MAGNETIC TAPE

Kenji Hashizume, Nagano; Masatoshi Okamura, Saku, and Haruo Shiba, Komoro, all of Japan, assignors to TDK Corporation, Tokyo, Japan

Filed Apr. 10, 1989, Ser. No. 335,940
Claims priority, application Japan, Apr. 19, 1988, 63-52328[U]
Int. Cl.[5] G03B *1/04;* B65H *75/18*
U.S. Cl. 242—71.8 4 Claims



1. A reel for a magnetic tape which comprises:

a hub in a cylindrical form with an integral boss at its upper surface,

a lower flange formed at the lower part of said hub by one-piece molding,

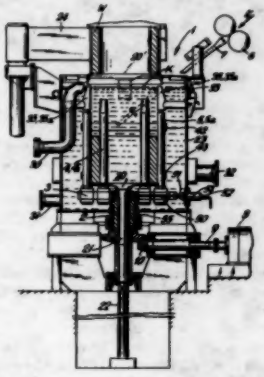
an upper flange with an aperture for allowing insertion of said boss, the upper flange being fitted to said hub, wherein said boss is formed in a tapered shape, and a fitting ring formed of the same material as said boss and having a fitting opening having a diameter smaller than the greatest diameter of a tapered portion of said tapered boss is mounted on said hub with said upper flange interposed between said hub and said fitting ring by inserting said boss in the fitting opening of said fitting ring and by melt-bonding the inner circumference of the fitting opening to the outer periphery of said tapered boss.

4,930,715

ROTARY BASKET WINDER WITH WATER COOLING

Günter Grenz, Meerbusch, and Werner Kohlstedde, Hilden, both of Fed. Rep. of Germany, assignors to SMS Schloemann-Siemag Aktiengesellschaft, Dusseldorf, Fed. Rep. of Germany

Filed Jan. 23, 1989, Ser. No. 300,481
Claims priority, application Fed. Rep. of Germany, Jan. 20, 1988, 3801465
Int. Cl.[5] B21C *47/00;* C21D *1/62*
U.S. Cl. 242—83 6 Claims



1. A rotary basket winder with cooling for winding material comprising a tank having an axial center and being in the shape of an open top tank with a closed bottom, means within said tank for rotating material to be wound around a generally vertical axis, said means comprising a horizontally arranged rotatable winding carrier located within said tank, a pair of concentrically arranged rings of upwardly extending rods supported at the lower ends thereof on said carrier end located within said tank including an inner ring spaced radially inwardly from an outer ring and forming therebetween an upwardly extending annular winding space for the material to be wound, a stationary guide pipe arranged for supplying material into the annular winding space, said means for rotating material includes a drive shaft extending upwardly through the bottom of said tank and arranged to rotate said winding carrier and rings, a horizontal winding disk having a lower position within said tank closely above said carrier and being displaceable upwardly to an upper position for removing wound material from the annular winding space, means for sealing said drive shaft in the bottom of said tank, means for supplying and effecting regulated flow of coolant in said tank, wherein the improvement comprises that said means for supplying and effecting regulated flow includes outlet openings in said tank adjacent the open top thereof, said outlet openings being arranged for conveying coolant from said tank back into the axial center of said tank at the upper end thereof, rigid pins are located in the upper region of said tank generally above and separate from said rods of said outer ring, said rigid pins form a ring having an inside diameter approximately equal to the inside diameter of said outer ring of winding rods, said pins are

stationary relative to rotation of said inner and outer rings, said pins extend vertically in a laterally spaced relationship, said pins are radially adjustable relative to the axial center of said tank and said pins located opposite and inwardly from said outlet openings adjacent the open top of said tank.

4,930,716
CABLE REEL

Hiroyuki Bannai, Miyagi, Japan, assignor to Alps Electric Co., Ltd., Tokyo, Japan

Filed Feb. 16, 1989, Ser. No. 312,013
Claims priority, application Japan, Apr. 4, 1988, 63-44724[U]
Int. Cl.[5] H01R *39/02*
U.S. Cl. 242—85 **5 Claims**

1. A cable reel comprising:
a fixed member;
a moveable member rotably engaged with said fixed member in such a manner that a space is defined between said fixed member and said moveable member;
a flat cable received in said space in a wound condition with a predetermined number of turns, said flat cable having opposite ends fixed to said fixed member and said movable member; and
a cutter provided in the vicinity of a fixed portion of said flat cable on said fixed member, wherein when said movable member is rotated by a predetermined amount or more, said flat cable is cut by said cutter;
the improvement wherein said flat cable comprises a first flat cable and a second flat cable attached to each other and a first length from a fixed portion of said first flat cable on said movable member to said cutter is different from a second length from a fixed portion of said second flat cable on said movable member to said cutter.

4,930,717
HOSE STORING APPARATUS

Cornelis F. de la Haye, Den Haag, Netherlands, assignor to Koppens Automatic Fabrieken B.V., Netherlands

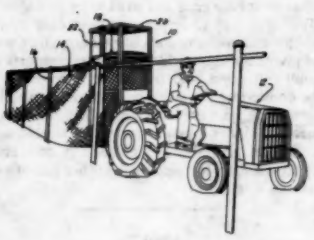
Filed Mar. 6, 1989, Ser. No. 319,245
Claims priority, application European Pat. Off., Jan. 25, 1989, 89200151.2
Int. Cl.[5] B67D *5/365*; B65H *75/36*; B60S *5/02*
U.S. Cl. 242—86 **8 Claims**

1. In a hose storing apparatus having a casing, a hose passage outlet in said casing, a fluid supply connection in said casing, a flexible hose attached at one end thereof to said supply connection, a nozzle attached to another end of said hose, a partition vertically disposed within said casing and forming first and second side-by-side compartments within said casing, a counterweighting freely movable disc vertically disposed within said first compartment, and means disposed within said casing and above said partition for passing said hose disposed within said first compartment to said second compartment, the improvement comprising a plurality of horizontally disposed small rollers forming a vertical arc of the small rollers within said casing, said arc of small rollers being disposed above and across said partition, and said hose being disposed from said supply connection into said first compartment in the form of a first loop which passes underneath and partially around said movable disc, over said small rollers, into said second compartment in the form of a second loop and out of said hose passage outlet.

4,930,718
FENCING DISPENSER

Jeff J. Lancour; Ronald D. Chouinard, both of Escanaba, and Carl J. Wick, Gladstone, all of Mich., assignors to L & C Enterprises - USA, Inc., Escanaba, Mich.

Filed Dec. 21, 1988, Ser. No. 287,496
Int. Cl.[5] B65H *49/38*
U.S. Cl. 242—86.5 R **12 Claims**



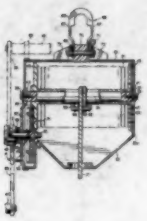
1. A dispensing apparatus for dispensing fencing fabric from a roll of fabric to be carried by a vehicle, said apparatus comprising:
a cage comprising an elongated enclosure configured to receive a roll of fencing fabric therein, said cage including structure extending across one side thereof, a gate extending along the length of said cage, said one side being releasably connected on one side to the remaining cage structure and hinged along the other side to be openable to enable loading of a roll of fencing fabric into said cage;
cage holder structure adapted to be mounted to said vehicle, said cage holder structure including means pivotally supporting said cage structure and power cylinder means drivingly connected to said cage and said cage holder structure to allow selective driving of said cage from an upright position whereat said fencing fabric is dispensed, to a horizontal position with said gate vertically positioned away from said vehicle; power means for thereafter lowering said pivoted cage to position said cage horizontally at grade level whereat said roll may be loaded through the open side of said cage created after opening of said gate, said roll able to be advanced into said cage interior, said gate, closed, said power means thereafter raising said cage, and said power cylinder means pivoting said cage to an upright position ready for dispensing of said fencing fabric from said roll.

4,930,719

TOW-LINE WINDING DEVICE

Douglas Sehl, Waterdown, Canada, assignor to The Ski-East Limited Partnership, Waterdown, Canada

Filed Sep. 12, 1988, Ser. No. 242,661
Claims priority, application Canada, Apr. 8, 1988, 563628
Int. Cl.[5] B65H *75/34*; B66D *1/14*
U.S. Cl. 242—86.5 A 2 Claims



1. A device for winding and unwinding a waterskiing tow-line, the device comprising:

a substantially enclosed housing having an opening through which the tow-line may freely pass;

a generally U-shaped shackle means having arms extending from a common, mutually connecting portion, said arms being affixed at respective ends thereof spaced apart from the connecting portion, to the leading wall of the housing in detachably affixed relation by means of a removable pivot, and in protruding relation from the housing, so as to allow for releasable attachment of the device to a ski-boat, said shackle means comprising means for slidingly receiving between said arms a portion of a conventional ski-post mounted on the ski-boat, in secured, releasably interfitting relation therewith, without the use of hand tools;

a spool means mounted for rotation in the housing and adapted for retaining the tow-line in winding relation around a centrally disposed axle portion;

a driven gear mounted on the spool means for rotational driving thereof;

a drive shaft journaled in the housing for rotation and for axial sliding relative to the housing and having a first end portion protruding from the housing and a second end portion extending into the housing;

a drive gear affixed to the drive shaft for rotation and for axial sliding with the drive shaft;

a spring means mounted in the housing and adapted for biasing the drive gear into meshing engagement with the driven gear;

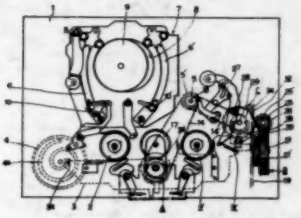
a crank member having a handle portion adjacent one end and a yoke portion adjacent the opposite end, the crank member being pivotally connected to the second end portion of the drive shaft by means of a pivot pin passing eccentrically through the yoke portion and the second end portion, such that, upon pivoting movement of the crank member to a first orientation generally transverse to the axis of the drive shaft, the yoke portion urgingly contacts the housing so as to cause axial sliding of the drive shaft in a first axial direction against the biasing of the spring means, thereby causing disengagement of the drive gear from the driven gear, so as to allow for free-rotation of the spool means and unwinding of the tow-line from said axle portion of the spool means, and such that, upon pivoting movement of the crank member to a second orientation 180° opposite to said first orientation, the yoke portion is removed from said contact with the housing so as to allow the drive shaft to slide in an axially opposite second direction under biasing of the spring means thereby to cause engagement of the drive gear with the driven gear so as to allow for controlled rotation of the spool means upon rotation of the crank member, thereby to wind the tow-line around said axle portion of the spool means.

4,930,720

CASSETTE LOADING DEVICE FOR VCR

Hak S. Hwang, Seoul, D.P.R. of Korea, assignor to Goldstar Co., Ltd., Seoul, D.P.R. of Korea

Filed Sep. 14, 1988, Ser. No. 244,410
Claims priority, application D.P.R. of Korea, Sep. 15, 1987, 15765/1987
Int. Cl.[5] G11B *15/32*
U.S. Cl. 242—198 2 Claims



1. A cassette loading device for a VCR which comprises:

a main chassis having an upper surface and a lower surface,

a supply reel and a take-up reel rotatably mounted on the upper surface of the main chassis,

a capstan motor disposed on the lower surface of said main chassis for driving said supply reel and take-up reel,

a cassette loading unit disposed on one side of the upper surface of said main chassis

for loading a cassette and being adapted to selectively transmit the driving force of the capstan motor, and

a function plate disposed on the one side of the lower surface of said main chassis

said function plate interlocked with a cam gear disposed on the lower surface of said main chassis and a driving force conversion unit for selectively connecting the force of the capstan motor to the cassette loading unit, said driving force conversion unit including:

a shaft disposed between said capstan motor and a worm of said cassette loading unit,

a driven pulley having jaws disposed on the upper portion of said driven pulley , said driven pulley being rotatably mounted at the lower portion of said shaft and interconnected with a lower pulley which is fixed to the lower end of a rotatory shaft of said capstan motor through a belt,

a drive gear provided with pin holes and rotatably mounted at the upper portion of said shaft,

a rotating member having pins disposed on the upper portion of said rotating member and jaws disposed on the lower portion of said rotating member thereof and disposed between said drive gear and said driven pulley,

a pressing coil spring interposed between said rotating member and said drive gear, and

an up and down lever having a bent portion disposed at one end thereof and a pair of lifting members disposed at the other end of said up and down lever, said up and down lever movably mounted on a fixing member fixed on the main chassis, said lifting members engaged with a circular groove formed on the outer peripheral surface of said rotating member and adapted to separate said rotating member having said driven pulley and a slant guide member formed at one end of said function plate which is adapted to press said bent

portion of said up and down lever, whereby the cassette loading device effectively loads and unloads a tape cassette by utilizing the driving force of the capstan motor.

4,930,721

ROLL FILM DRIVING DEVICE

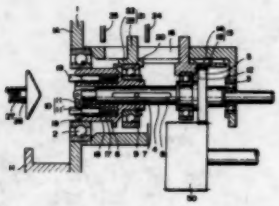
Shinji Murata, Tokyo, and Masahiko Ito, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 22, 1988, Ser. No. 158,658

Claims priority, application Japan, Feb. 27, 1987, 62-42733; Feb. 27, 1987, 62-42734; Feb. 27, 1987, 62-42735

Int. Cl.[5] G11B *15/32, 23/04;* G03B *1/04*

U.S. Cl. 242—200 23 Claims



1. A roll film driving device comprising:

a driving shaft;

support means for supporting selectively at a predetermined position one of at least two film cartridges which differ in shape from each other in the manner in which they couple with said driving shaft;

coupling means for coupling said driving shaft with each of said film cartridges, said coupling means including a first coupling member being capable of coupling with a first type film cartridge placed at the predetermined position and a second coupling member being capable of coupling with a second type film cartridge placed at the predetermined position, said first and second coupling members movable between a coupled position and a non-coupled position;

moving means for moving said first and second coupling members to the coupled position and the non-coupled position, respectively;

a first lock means for locking the first coupling member to the non-coupled position;

a second lock means for locking the second coupling member to the non-coupled position; and

release means for releasing selectively one of the first and second coupling members from a locked state thereof, only one of the coupling members released by the releasing means being movable to the coupled position.

4,930,722

DRAG MECHANISM FOR A SPINNING REEL

Junichi Toda, Sakai, Japan, assignor to Shimano Industrial Company Limited, Osaka, Japan

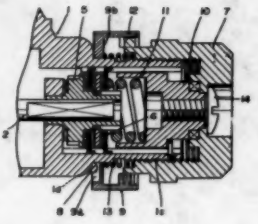
Filed Mar. 18, 1988, Ser. No. 169,875

Claims priority, application Japan, Mar. 24, 1987, 62-43221[U]; Mar. 24, 1987, 62-43222[U]; Dec. 26, 1987, 62-198576[U]

Int. Cl.[5] A01K *89/01, 89/02*

U.S. Cl. 242—245 3 Claims

1. A fishing reel comprising a spool and a drag mechanism for applying a braking force against rotation of said spool, said drag mechanism being provided with dragging members, an adjuster comprising an operation portion operable by a fisherman for adjusting the braking force applied by said dragging members, a stationary side member stationary with respect to said spool, a reference portion provided at one of said stationary side member and said adjuster and comprising a single reference position so as to indicate a single position where an optimum braking force is obtained, and a position setting member provided at the other of said stationary side member and said adjuster and having a single position setting portion, one of said reference portion and said position setting member being supported position-changeably with respect to the other of said reference portion and said position setting member, such that said single position setting portion and said single reference position can be made to correspond in position to one another, wherein said stationary side member is a reel body at said spinning reel, provided with a support cylinder, said adjuster being screwably mounted on said support cylinder, said



reference portion being provided at said reel body, and said position setting member being supported position-changeably with respect to said reel body, said fishing reel further comprising a reference member having said reference portion, said reference member being supported position-changeably with respect to said reel body.

4,930,723

BRAKING FORCE MEASURING MECHANISM FOR A SPINNING REEL

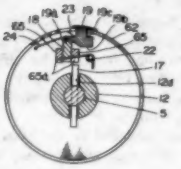
Junichi Toda, Sakai, Japan, assignor to Shimano Industrial Company Limited, Osaka, Japan

Filed Mar. 29, 1989, Ser. No. 330,362

Claims priority, application Japan, Mar. 30, 1988, 63-42166[U]

Int. Cl.[5] A01K *89/01, 89/02*

U.S. Cl. 242—245 6 Claims



1. A spinning reel comprising:

a reel body;

a spool shaft supported to said reel body;

a spool provided with a fishing line winding portion and a cylindrical skirt, said spool being disposed around said spool shaft and supported to be rotatable relative to said reel body;

a drag mechanism for applying a braking force against rotation of said spool; and

a braking force measuring mechanism for measuring a braking force set by said drag mechanism and being provided with

(i) a braking side member subjected to the braking force set by said drag mechanism; said spool being supported to be rotatable relative to said braking side member;

(ii) a measuring elastic member provided between said braking side member and said spool and biasing said spool in a direction opposite to a direction of drawing out from said spool a fishing line wound thereon;

(iii) a pointer provided at one of said braking side member and said spool;

(iv) an indicating portion for indicating a magnitude of the

braking force and provided at the other of said braking side member and said spool;

(v) a retaining portion provided at said braking side member;

(vi) a blocking member provided within said skirt at said spool and engageable with or disengageable from said retaining member so as to engage therewith to block rotation of said spool with respect to said braking side member in the direction of drawing out the fishing line; and

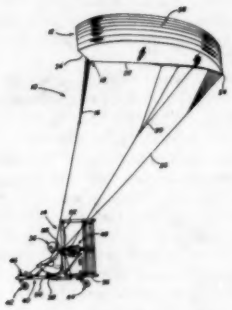
(vii) an operating member provided at the outer periphery of said skirt and movably operating said blocking member in the engaging or disengaging direction with respect to said retaining portion.

4,930,724

POWERED AIRFOIL CANOPY AIRCRAFT

Stephen L. Snyder, 420 Pleasant Valley Ave., Moorestown, N.J. 08057

Filed Mar. 11, 1983, Ser. No. 487,221
Int. Cl.[5] B64C *39/00*
U.S. Cl. 244—13 **13 Claims**



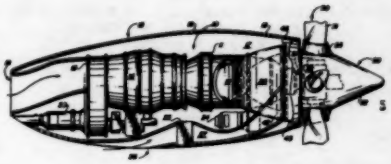
1. In combination with a ram air inflated flexible airfoil canopy having a leading edge portion extending spanwise transverse to a forward direction of travel, a trailing edge portion and a bottom portion extending chordwise between the leading and trailing edge portions, a pilot supporting vehicle having a longitudinal axis, a plurality of flexible load lines connecting the canopy to the vehicle, and powered means mounted on the vehicle for imparting forward thrust thereto in said forward direction of travel, the improvement residing in means connecting the load lines to the vehicle for suspension thereof from the canopy varying between level flight and take-off attitudes in response to changes in said forward thrust, including at least two pivotal load line anchors from which the load lines respectively extend to the leading edge portion of the canopy and to the bottom portion intermediate the leading and trailing edge portions, and means mounting said two anchors on the vehicle spaced from each other along said longitudinal axis, said anchor mounting means including an arm on which the two anchors are located, and means connected to the vehicle for operatively positioning the arm in laterally spaced relation to the longitudinal axis in response to tensioning of the load lines, and means for locking the arm at an adjusted location along the longitudinal axis in response to said operative positioning thereof by the positioning means, the positioning means including a cross bar rigidly connected to the vehicle, a lever element having opposite ends, the arm being rigidly connected to the lever element at one of said ends thereof, and hinge means connecting the lever element at the other end thereof to the cross bar for displacement about perpendicular axes between retracted and extended positions, one of the axes being a vertical adjustment axis about which the arm is located and locked by the locking means when operatively positioned in response to said tensioning of the load lines.

4,930,725

PUSHER PROPELLER INSTALLATION FOR TURBOPROP ENGINES

Craig E. Thompson, Gilbert, and Jack H. Rowse, Tempe, both of Ariz., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Dec. 16, 1988, Ser. No. 285,822
Int. Cl.[5] B64D *29/00*
U.S. Cl. 244—53 R **9 Claims**



1. Aircraft apparatus having a forward flight direction and comprising:

a gas turbine engine, said engine including an elongate fore-and-aft extending housing defining an inlet port through which is inducted ambient air, a compressor receiving said inducted air and discharging said air pressurized, a combustor receiving said pressurized air along with a supply of fuel to support combustion producing a flow of pressurized high temperature combustion products, a turbine rotatable in said flow of combustion products to extract mechanical power therefrom for driving connection to a rearwardly extending rotatable output shaft having a direction of rotation and being carried exclusively by said engine, and an outlet port communicating with ambient and discharging said flow of combustion products at a relatively lowered temperature and pressure from said engine;

a rotatable propeller unit having a hub carried by said output shaft rearwardly of said engine and drivingly connecting thereto for delivering mechanical power therefrom to a plurality of radially extending propeller blade members carried by said hub, each propeller blade member of said plurality including a root portion adjacent said hub and an aerodynamic airfoil portion extending radially outwardly of said root portion, said propeller unit rotatingly reacting with ambient air to generate propulsive force for conveyance to said aircraft via said engine;

nacelle means for providing environmental protection to said engine while affording an aerodynamically favorable outward configuration, said nacelle having an air inlet, opening to ambient and communicating ambient air to said engine inlet port, said nacelle cooperating with said engine housing to define a nacelle cavity enveloping the latter, and said nacelle terminating rearwardly at a transverse plane proximate to but forward of said plurality of propeller blade members, means for inflow of ambient cooling air to said nacelle cavity:

generally rearwardly convergent conical spinner means extending rearwardly from said transverse plane for providing environmental protection to said propeller mechanism while affording an aerodynamically favorable outward configuration, a plurality of radially extending cuff members each receiving therein a respective one of said plurality of propeller blade members adjacent the root portion thereof,

transition duct structure, at a forward end thereof communicating with said engine outlet port to receive said flow of combustion products, said transition duct structure extending rearwardly to terminate forwardly of said trans-

verse plane in a semicirculuar outlet, an annular momentum exchange plenum forwardly aligning with said transition duct outlet to define an inlet to said momentum exchange plenum and extending aft, said transition duct directing said flow of combustion products rearwardly across said momentum exchange plenum to induce additional gaseous inflow at said inlet thereof, and

said momentum exchange plenum conveying said flow of combustion products and additional gaseous inflow to the atmosphere forwardly of said spinner means.

4,930,726

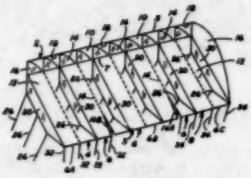
BUILT-IN CONTROL FLAPS FOR A MULTI-CELL WING TYPE CANOPY

Domina C. Jalbert, 425 Wavecrest Ct., Boca Raton, Fla. 33432

Filed Dec. 22, 1988, Ser. No. 288,469

Int. Cl.[5] B64C 9/00

U.S. Cl. 244—90 R **18 Claims**



1. In combination, a ram air multi-cell wing type flexible canopy, said canopy having a front end and rear end, said canopy having a ram air inlet at the front end and a trailing edge at the rear end, a built-in control flap being located in each side of said canopy at the rear portion thereof, each built-in control flap being separated lengthwise by being split from the center portion of the canopy between the built-in control flaps so that each control flap can be bent downwardly without deforming the center portion of the canopy.

4,930,727

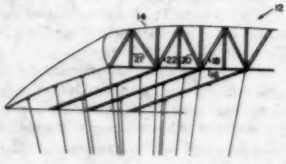
CROSS BRACED AIRFOIL

Bill J. Coe, 2761 W. 78 St., Hialeah, Fla. 33016

Filed Nov. 17, 1988, Ser. No. 272,328

Int. Cl.[5] B64D 17/02

U.S. Cl. 244—145 **8 Claims**



1. A wing type parachute including a top panel having a front edge and a rear edge, a plurality of spaced generally vertical rib panels extending in a common direction away from the top panel and said spaced vertical rib panels extending from the front edge of the top panel toward the rear edge of the top panel defining cells below the top panel, a plurality of spaced suspension lines extending from the parachute, means to attach the suspension lines to the parachute extending along a plurality of rows oriented in a substantially fore to aft direction along the parachute, and plurality of angularly oriented rib panels, each having an upper edge and a lower edge and the upper edge being connected to the parachute in the zone of attachment of a vertical rib panel to the top panel and with the lower edge of the angularly oriented rib panels being connected to the parachute adjacent one of the fore aft rows, the angularly oriented rib panels converging toward one another at the top panel.

4,930,728

RAM AIR AERIAL DEVICE WITH LOWER SKIN PRESSURE REGULATOR

George R. Wittington, 206 W. York St., Dillsburg, Pa. 17019

Filed Apr. 21, 1989, Ser. No. 341,211

Int. Cl.[5] B64D 17/02

U.S. Cl. 244—145 **27 Claims**

1. A flow form device cell of the type used primarily to maintain both vertical and horizontal stability and maneuverability in a predetermined fluid environment, said cell having a leading edge, a trailing edge and two sides, said cell comprising:

a flexible sheet having a front edge, a rear edge, and first and second side edges, said front edge forming a portion of said leading edge of said cell and said rear edge forming a portion of said trailing edge of said cell;

a flexible lower sheet spaced below said upper sheet and having a front edge, a rear edge, and first and second side edges, said front edge forming a portion of said leading edge of said cell and said rear edge forming a portion of said trailing edge of said cell, said rear edge of said lower sheet and said rear edge of said upper sheet being fastened together to form said trailing edge;

a pair of flexible side sheets connecting said upper sheet to said lower sheet, a first side sheet being disposed between said first side edge of said upper sheet and said first side edge of said lower sheet along the entire length of said upper and lower sheets and a second side sheet being disposed between said second side edge of said upper sheet and said second side edge of said lower sheet along the entire length of said upper and lower sheets;

a leading edge air inlet formed by said front edges of said upper and lower sheets and the front edges of said pair of side sheets;

wherein said upper sheet, said lower sheet, said pair of side sheets, said leading edge air inlet, and said trailing edge form the outer boundaries of said cell and said cell comprises at least one closable air inlet vent opening into said cell; and

wherein said lower sheet comprises a first forward skin and a second rearward skin, said first forward skin having a front edge forming the front edge of said lower sheet and extending to a rear edge at a rear portion, said second rearward skin having a front edge at a front portion and extending to a rear edge forming the rear edge of said lower sheet, said front edge of said second rearward skin being disposed forward of said rear edge of said first forward skin so that one of said rear portion of said first forward skin and said front portion of said second rearward skin overlaps the other, said rear portion of said first forward skin and said front portion of said second rearward skin form a first closable air inlet vent opening into said cell wherein a first side of one of said rear portion of said first forward skin and said front portion of said second rearward skin is connected at a first connection to said first side sheet at a point spaced above the junction of the other of said second rearward skin and said first forward

skin with said first side sheet, and a second side of one of said rear portion of said first forward skin and said front portion of said second rearward skin is connected at a second connection to said second side sheet at a point spaced above the junction of the other of said second rearward skin and said first forward skin with said second side sheet, one of said rear portion of said first forward skin and said front portion of said second rearward skin having a predetermined width such that when air pressure inside said cell exceeds the air pressure outside said cell one of said rear portion of said first forward skin and said front portion of said second rearward skin is forced onto the other of said front portion of said second rearward skin and said rear portion of said first forward skin to close said first air inlet vent opening by lying substantially flat on the other of said front portion of said second rearward skin and said rear portion of said first forward skin without billowing out of said cell and to maintain air pressure inside said cell, and when the air pressure outside said cell exceeds the air pressure inside said cell one of said rear portion of said first forward skin and said front portion of said second rearward skin is forced upwardly away from the other of said front portion of said second rearward skin and said rear portion of said first forward skin to open said first air inlet vent opening by forming a shape that curves upwardly from said first and second connections to at least one high point therebetween.

4,930,729

CONTROL OF FLUID FLOW

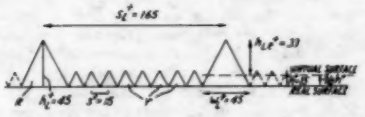
Anthony M. Savill, Cambridge, England, assignor to Rolls-Royce plc, London, England

Filed Jun. 27, 1989, Ser. No. 372,153

Claims priority, application United Kingdom, May 22, 1986, 8612485; May 22, 1986, 8612486; May 22, 1986, 8612487; Mar. 19, 1987, 8706554

Int. Cl.[5] B64C *21/10*

U.S. Cl. 244—200 **50 Claims**



1. A fluid dynamic wall surface having a series of elongate projections on said surface extending in the direction of fluid flow relative to said surface for modification of a turbulent boundary layer on said surface, said projections comprising larger and smaller height projections, adjacent ones of said larger height projections being spaced apart from each other and a plurality of said smaller height projections being disposed therebetween, said larger height projections and said smaller height projections being discreet, separate formations of said surface, said larger height projections projecting farther into said boundary layer in use than all said smaller height projections.

4,930,730

NEUTRAL POSITION LOCKING SYSTEM FOR AIRCRAFT CONTROL SURFACES

David C. Quick, Rockford, Ill., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Dec. 18, 1987, Ser. No. 134,757

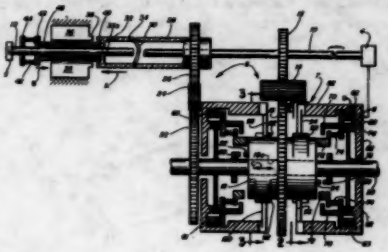
Int. Cl.[5] B64C *13/14*

U.S. Cl. 244—224 **16 Claims**

12. An automatic neutral position locking system for a control surface of an aircraft and the like, comprising:

means for locking the control surface against movement;

means for actuating the locking means in response to the control surface reaching a neutral position; and



means responsive to a loss of hydraulic pressure in the system for activating the actuating means to lock the control surface in neutral position responsive to the control surface itself reaching the neutral position.

4,930,731

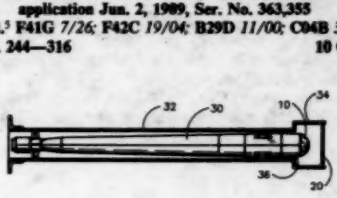
DOME AND WINDOW FOR MISSILES AND LAUNCH TUBES WITH HIGH ULTRAVIOLET TRANSMITTANCE

Donald W. Roy, Golden, and James L. Hastert, Lakewood, both of Colo., assignors to Coors Porcelain Company, Golden, Colo.

Continuation of Ser. No. 47,422, May 6, 1987, abandoned. This application Jun. 2, 1989, Ser. No. 363,355

Int. Cl.[5] F41G *7/26*; F42C *19/04*; B29D *11/00*; C04B *35/62*

U.S. Cl. 244—316 **10 Claims**



9. A guided missile comprising:

a missile propulsion system for moving the missile in a controllable direction;

an optical guidance system operably connected to said propulsion system for controlling said direction of said movement;

a dome covering at least a portion of said optical guidance system, the dome comprising a transparent, sintered polycrystalline body comprising magnesia-alumina spinel, having a transmittance per 1.88 mm thickness at all wavelengths in the wavelength region between 0.4 microns and 0.5 microns of at least about 82%, at all wavelengths in the wavelength range between 3.0 microns and 4.0 microns of at least about 81%, and at all wavelengths in the wavelength range between 4 microns and 5 microns of at least about 76%, having a flexural strength of at least about 20,000 psi and having a knoop hardness of at least about 1350 kg mm^{-2}.

4,930,732

YOKE PIPE CLIP

Hans-Herlof Hardtke, Zeven, Fed. Rep. of Germany, assignor to Lisega GmbH, Fed. Rep. of Germany

Filed May 15, 1989, Ser. No. 351,637

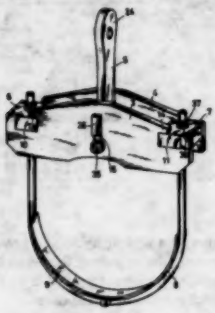
Claims priority, application Fed. Rep. of Germany, May 19, 1988, 3817059

Int. Cl.[5] F16L *3/00*

U.S. Cl. 248—62 **18 Claims**

1. A pipe clip for supporting pipe comprising a pair of generally longitudinal plates in side-by-side relationship, a pair of

generally transverse plates disposed one each at opposite ends of said longitudinal plates, a suspension bracket positioned between said opposite ends, a yoke, means for securing said yoke to said transverse plates, first means for interlockingly securing said transverse plates to said longitudinal plates at



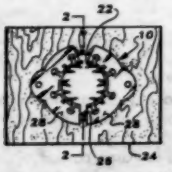
each of said opposite ends, second means for interlockingly securing said longitudinal plates to said suspension bracket, said first interlocking securing means include cooperatively engaged projections and slots, and said second interlocking securing means include cooperatively engaged projections and slots.

4,930,733

PIPE HOLDERS

Duane D. Logsdon, Fullerton, Calif., assignor to Logsdon Foundation, Stanton, Calif.

Continuation-in-part of Ser. No. 290,985, Dec. 28, 1988, Pat. No. 4,903,921. This application Apr. 19, 1989, Ser. No. 340,214
Int. Cl.[5] F16L 5/00
U.S. Cl. 248—56 7 Claims



1. A pipe holder having a split cylindrical body having a plurality of spaced pipe engaging fins located on the interior thereof, a plurality of holding means for engaging the interior of a hole in a support member located on the exterior thereof, and flange means for limiting the insertion of said body into such a hole by engaging a surface in the support member, said body being capable of being temporarily opened along the slit therein so that it can be fitted around a pipe, in which the improvement comprises:

said holding means comprising a plurality of spaced, radially extending elongated vanes for engaging the interior of an elongated hole, each of the vanes having an edge located remote from the body, each of said vanes also having a barb means located on each of said edges;

a plurality of spaced, resilient, flexible fins for holding a pipe located in the interior of said body, said fins extending along the length of said body parallel to the axis of said body, said fins being located so as not to be pointed directly toward the center of said body when said body is in a closed configuration so as to resiliently support a pipe held by said pipe holder so as to avoid the ends of said fins tending to contact the pipe so as to damage it and so as to accommodate heat-caused expansion of said pipe;

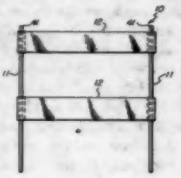
each of said fins having a triangular shape and having sides which are located at an angle of from about 30 degrees to about 60 degrees to one another and being long enough so that the length of a line connecting its end with the midpoint of another line extending between its corners along said body is at least 150% of the length of said other line.

4,930,734

HOLDER FOR PLASTIC GROCERY BAGS

George M. Schmidt, 1901 Altura Dr., Corona Del Mar, Calif. 92525

Filed Jan. 24, 1989, Ser. No. 301,221
Int. Cl.[5] A63B 55/04
U.S. Cl. 248—97 19 Claims



1. A holder for supporting flexible bags in an upright position with the mouth of the bag in an open position, said holder being assembleable without separate fastening means or tools and comprising:

a. a pair of relatively thin end panels of generally uniform thickness and uniform cross-sectional shape,

b. At least one pair of elongated relatively thin side rails of generally uniform thickness, and

c. Means for releasably fastening opposite lateral ends of a first one of said side rails to a separate one of said end panels at a front edge of said end panel, and, a second one of said side rails to said end panels at the rear edges thereof, in a similar position to said first side rail, said first and second side rails being perpendicular to said end panels and thereby forming a rectangular plan view open space between the inner surfaces of said end panels and said side rails for receiving a flexible bag, and

d. Means for releasably fastening said bag in an open position to said holder,

e. Wherein said means for releasably fastening an opposite lateral edge of a side rail to an edge of an end panel comprises an elastically deformable, bifurcated member extending perpendicularly inwards from an edge of said side rail, said bifurcated member having adjacent flange sections with a space therebetween for insertably receiving in an interference fit said edge of said end panel.

4,930,735

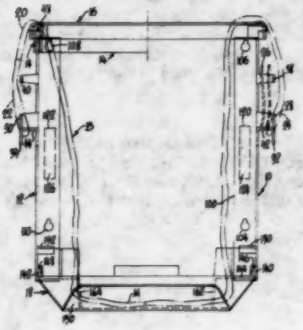
BAG APPARATUS FOR SUPPORTING PLASTIC BAGS AND THE LIKE

Michael Lax, Oyster Bay Cove, N.Y., assignor to Astronic Plastics, Inc., Westbury, N.Y.

Filed Jun. 30, 1989, Ser. No. 374,545
Int. Cl.[5] B65B 67/04
U.S. Cl. 248—101 17 Claims

1. A bag apparatus comprising spaced upright sides including upper and lower portions, said sides being adapted for being supported on a common supporting structure, a detachable open frame coupling said sides and defining a mouth through which said bag depends, said bag having a peripheral margin adapted for being draped over said frame, a lower member extending between and detachable from said sides and adapted for supporting a source of replacements for said bag said bag including handles on the peripheral margin thereof,

protrusions on said sides for engaging said handles on said bag, and a cover detachably coupled to said sides in pivotal manner and in a position for selectively covering the mouth of said frame, said frame comprising a plurality of sides connected in polygonal configuration and of generally inverted U-shaped



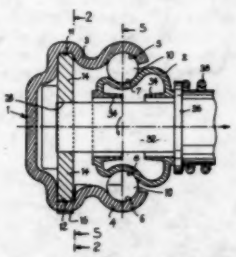
cross-section having connected legs, two of the sides of the frame being adapted to receive the upper portions of the upright sides, said two sides including upwardly open notches to pass one of the legs of a third of the sides of the frame, the third side connecting the two said sides of the frame.

4,930,736

LOCKING DEVICE FOR THE GUIDING SLIDE OF A VEHICLE SEAT OR THE LIKE

Francois Fourrey, Montbeliard; Serge Deley, Seloncourt, and Jean M. Coussemacq, Valentigney, all of France, assignors to ECIA - Equipements et Composants pour l'Industrie Automobile, Audincourt, France

Filed May 9, 1989, Ser. No. 349,271
Claims priority, application France, May 19, 1988, 88 06730
Int. Cl.[5] F16M *13/00*
U.S. Cl. 248—430 **8 Claims**



1. Locking device for the guiding slide of an adjustable vehicle seat to be mounted on a floor, comprising:

an external generally U-shaped elongated element (1) with holes or notches (18) along its length;

an internal elongated element (2) slidingly supported in said external element (1);

a locking bolt (14) cooperating with said notches (18) and slidingly and pivotally mounted inside said external element (1) for movement between a locked position and an unlocked position to adjust the seat position;

clutch means; and

an actuating pin (32) transversely mounted in said internal element (2) to be translationally and rotatively movable and disconnectably joined to said locking bolt (14) by said clutch means (28, 29, 30, 32);

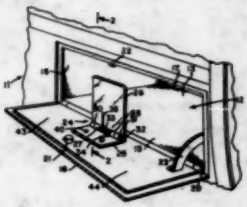
wherein said actuating pin (32) is movable between a first position, where said clutch means is engaged so that the actuating pin (32) can be rotated to pivot said locking bolt (14) between its locked and unlocked positions, and a second position where said clutch means is disengaged so that the locking bolt (14) is in its locked position, said external and internal elements (1, 2) being momentarily relatively movable.

4,930,737

ARTICLE RETAINER FOR GLOVE COMPARTMENT

Samuel J. McNeill, Redondo Beach, Calif., assignor to Fred N. Schwend, Mira Loma, Calif.

Filed Jun. 16, 1989, Ser. No. 367,336
Int. Cl.[5] B60R *7/06*
U.S. Cl. 296—37.12 **6 Claims**



1. In combination with a vehicle instrument panel having a storage compartment opening into said panel, a door for said compartment, and means pivotally supporting said door for movement from a generally vertical closed position to a generally horizontal open position;

a barrier plate,

means on the inner side of said door pivotally supporting said plate for movement about a horizontal axis,

stop means for limiting movement of said plate into a first position extending at least substantially at right angles to the general plane of said door, and

spring means for urging said plate to said first position whereby said plate extends substantially vertical when said door is in said open position,

said spring means being effective to prevent articles stored in said compartment from moving out of said compartment and deflecting said plate about said axis when said door is moved to open position.

4,930,738

PORTABLE SUPPORT BRACKET

John Lombardo, P.O. Box 874, Kirkland, Wash. 98083-0874

Filed Aug. 14, 1989, Ser. No. 393,570
Int. Cl.[5] A47G *29/00*
U.S. Cl. 248—205.1 **1 Claim**

1. A portable support bracket adapted to be detachably mounted upon a door hinge of the type having intermeshing sleeves held together by a hinge pin comprising:

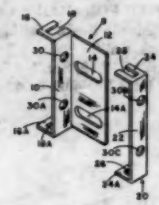
(a) a first member constructed from rigid material to form a first vertical base, said first vertical base is substantially rectangular in shape and,

a first pair of parallel arms, one each of said arms extending from opposite ends of, and perpendicular to said first vertical base, each said arm of said first member contains a slot therein, said slots being aligned on center, sidewardly opening; and sized to receive the shaft of said hinge pin therethrough, said arms of said first member are separated by sufficient distance to simultaneously mount above and below said intermeshing sleeves of said door hinge and,

a flange, said flange being substantially rectangular in shape, extending from one side of, and perpendicular to said first vertical base, said flange extends in the opposite direction to said first pair of parallel arms and;

(b) a second member constructed from rigid material to form a second vertical base, said second vertical base is substantially rectangular in shape and,

a second pair of parallel arms, one each of said second pair of parallel arms extending from opposite ends of, and perpendicular to said second vertical base, one said arm of said second member contains a slot therein, said slot being



aligned on center, forwardly opening and sized to receive said shaft of said hinge pin therethrough, the remaining said arm contains a centered threaded aperture therein, said second pair of parallel arms are separated by sufficient distance to simultaneously mount above and below said first pair of parallel arms of said first member;

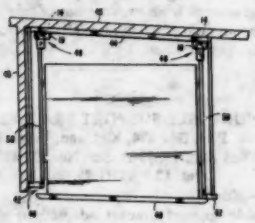
(c) said second member being detachably mounted over said first member with said first pair of parallel arms therebetween said second pair of parallel arms. and the slot opening of an arm of said first member being orthogonal with the slot opening of the second member.

4,930,739

CABINET DRAWER GUIDE ATTACHMENT AND ADJUSTMENT ASSEMBLY

James L. Brown, Sellersburg, Ind., assignor to Haas Cabinet Co., Inc.

Filed Jul. 21, 1988, Ser. No. 222,508
Int. Cl.[5] A47B 96/07
U.S. Cl. 248—220.2 **6 Claims**



1. A bracket assembly for use in cabinetry as a drawer slide rear mounting and comprising:

a drawer slide end bracket having a first portion with a cylindrical surface having a generally horizontal cylindrical axis, said bracket having a second portion extending generally horizontally from said first portion, said second portion having a height less than the diameter of said cylindrical portion, said bracket also having a slide receiving portion extending generally horizontally from said second portion for receiving a rear end of a drawer slide having a front and a rear end, said slide receiving portion being oriented so that said cylindrical axis is situated transverse to a vertical plane intersecting the front and rear of the drawer slide; and

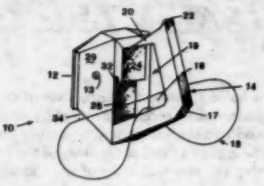
a mounting bracket having a rear surface adapted for mounting to a wall and having an upper surface projecting forward from said rear surface, and said mounting bracket also having a lower surface projecting forward from said rear surface, said upper and said lower surfaces being separated by a distance less than the diameter of said cylindrical surface, and said upper and lower surfaces coacting and comprising clamping means for releasably receiving said first portion of said end bracket.

4,930,740

EYEWEAR HOLDER

Paul A. Vogt, 1058 Ottawa Ave., West St. Paul, Minn. 55118

Division of Ser. No. 211,999, Jun. 27, 1988, Pat. No. 4,878,641.
This application Jul. 31, 1989, Ser. No. 387,142
Int. Cl.[5] A47F 5/00
U.S. Cl. 248—309.1 **11 Claims**



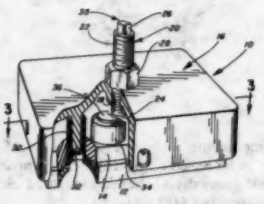
1. Eyewear storage apparatus comprising: a body member including a fastener portion mountable to a support surface, an eyewear support portion having an outer surface of successively increasing projection and means for frictionally gripping eyewear in contact therewith and a flexible strap including a fastener portion which mounts in detachable mating relation with said body member such that eyewear are restrained to said body member in a space between said strap and said eyewear support portion.

4,930,741

POWER ASSISTED EQUIPMENT MOUNTING SYSTEM

Sheldon E. Young, Darien; Michael L. Young, Western Springs, and Jerry D. Folkens, Westmont, all of Ill., assignors to Vibro Dynamics Corporation, Broadview, Ill.

Division of Ser. No. 59,126, Jun. 8, 1987, Pat. No. 4,846,436.
This application Mar. 28, 1989, Ser. No. 329,776
Int. Cl.[5] G01L 5/00
U.S. Cl. 248—542 **8 Claims**



1. An improved method of adjusting the height of an adjustable mounting which comprises

predetermining the desired height of the adjustable mounting

activating a lifting member intermediate a bearing portion of the mounting and a machine supporting portion of the mounting and extending the lifting member to reduce at

least a part of the load upon an adjustment member spacing the bearing portion and the machines's supporting portion apart,

adjusting the adjustment member while the load thereon is reduced to vary the distance between the bearing portion and the machine supporting portion while observing the actual height relative to the desired height until the actual height is equal to the desired height, and

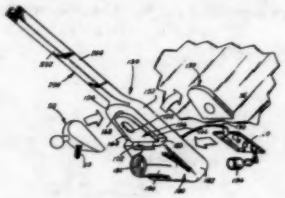
deactivating the lifting member.

4,930,742

REARVIEW MIRROR AND ACCESSORY MOUNT FOR VEHICLES

Kenneth Schofield; William W. Gallmeyer, and Theodore C. Zwiep, all of Holland, Mich., assignors to Donnelly Corporation, Holland, Mich.

Filed Mar. 25, 1988, Ser. No. 173,307
Int. Cl.[5] A47F 7/14
U.S. Cl. 248—475.1 **20 Claims**



1. A mounting adaptor for securing an accessory adjacent an interior rearview mirror in a vehicle, said adaptor comprising:

an adaptor body;

first mounting means on a first surface of said adaptor body for securing said adaptor body to a mounting support member when the support member is secured to the inner surface of a vehicle window such as a windshield;

securing means on a second surface of said adaptor body for removably mounting a rearview mirror assembly on said adaptor body;

said adaptor body also including support means for supporting a vehicular accessory; said support means including means for positioning the vehicle accessory for exposure to and visibility from the interior of the vehicle and/or for exposure to the vehicle exterior through the vehicle window on which the adaptor body is mounted;

whereby the accessory may be mounted adjacent the interior rearview mirror for proper operation of the accessory and/or convenient use by the vehicle driver or other occupant without interfering with the support of the rearview mirror, or its replacement, interchangeability or adjustability.

4,930,743

VIBRATION PROOFING SUPPORT STRUCTURE FOR ENGINE OF VEHICLE

Takeshi Ishimaru; Takeshi Kishi, both of Ehime, and Shigeo Yoshino, Osaka, all of Japan, assignors to Iseki & Co. Ltd., Matsuyama

Filed Dec. 16, 1988, Ser. No. 285,075
Claims priority, application Japan, Jan. 20, 1988, 63-011742
Int. Cl.[5] F16M 13/00
U.S. Cl. 248—638 **4 Claims**

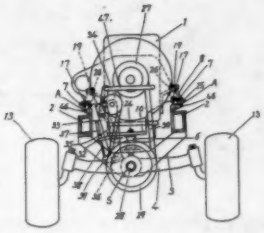
1. A vibration proofing support structure for an engine having driving and driven pulleys comprising:

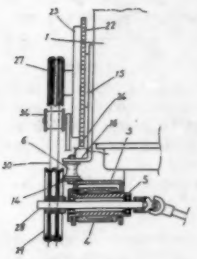
left and right multitudinally extending main frames;

a connecting frame positioned toward the front of said engine near said driving and driven pulleys laterally connecting said left and right frames;

a rotatable shaft connected to an intermediate portion of said connecting frame over the axis of said driven pulley;

a front lower vibration proofing member attached to said intermediate portion of said connecting frame and said rotatable shaft whereby said vibration proofing member prohibits unwanted slackening and tightening of a drive belt connecting said driving and driven pulleys and transmits laterally twisting forces to the rear portion of the engine;





a first rear vibration proofing member adapted to attach the rear portion of said engine to one of said main frames; and a second rear vibration proofing member attached to the rear portion of said engine in the other of said main frames.

4,930,744

PROGRAMMED MECHANISM FOR SELECTIVELY LOCATING SWIVEL BRACKET RELATIVE TO TRANSOM BRACKET

Robert W. Woodard, Waukegan, Ill.; Eric T. Lacht, Racine, and Danny L. Clark, Kenosha, both of Wis., assignors to Outboard Marine Corporation, Waukegan, Ill.

Filed Mar. 6, 1989, Ser. No. 319,576
Int. Cl.[5] F16M 1/02
U.S. Cl. 248—642 **12 Claims**

1. A marine propulsion device comprising a propulsion unit adapted to carry a propeller, a swivel bracket pivotally connected to said propulsion unit for relative steering movement therebetween about a steering axis, a link pivotally connected at one end to said swivel bracket about an axis transverse to said steering axis and having a laterally outwardly extending out-turned end, and a transom bracket adapted to be mounted on a transom of a boat, being pivotally connected to said swivel bracket for tilting movement about a tilt axis transverse to said steering axis and parallel to said first mentioned transverse axis, and including a surface extending generally in the direction of intended boat travel and having therein a recess receiving and engaging said out-turned end of said link and biasing said link inwardly, said recess including an endless main portion, a running position branch portion extending

downwardly from said endless main portion, and a shallow water drive position branch portion extending downwardly and forwardly from said endless main portion of said recess at a point above the extension of said running position branch portion from said endless main portion of said recess, said

endless main portion of said recess also including shoulder means for permitting movement of said link end in said endless main portion of said recess in one direction and preventing movement of said link end in said endless main portion of said recess in the direction opposite said one direction.

4,930,745

VARIABLE BORE RAM RUBBER

Stanley W. Granger, 23800 Gold Nugget, Diamond Bar, Calif. 91765; Joseph O. Beard, %31 Molino, Long Beach, Calif. 90814, and Frode Sveen, 12697 Orgen Ave., Chino, Calif. 91710

Filed Apr. 29, 1988, Ser. No. 188,267

Int. Cl.[5] E21B *33/06*

U.S. Cl. 251—1.1 **9 Claims**

1. A sealing apparatus for forming a fluid pressure-tight seal with at least part of the outer convex surface of a tubular member, said sealing apparatus comprising two identical, laterally opposed sealing elements having in plan view a generally semi-circular shape and adapted to abut one another along a front diametrical plane, each sealing element comprising;

a. a skeletal structure having a in plan view the shape of a generally uniform strip having a generally semicircular midsection having a concave front wall surface and two symmetrical elongated rectangular legs extending symmetrically and generally laterally outwards from opposite ends of said semi-circular midsection, said skeletal structure being formed of a plurality of rigid inserts, each of said inserts having a pair of generally parallel and similarly shaped upper and lower plates, each pair of said plates being joined together by a columnar pedestal disposed between the inner, facing surfaces of said pair of plates, said inserts being positioned adjacent one another to form a structure having a central traverse symmetry plane, said plates of said inserts adjacent to one another slidably engageable with one another to permit slidable relative motion parallel to said transverse symmetry plane, said inserts of each element comprising;

(i) a pair of end inserts each having elongated rectangular plan view bar-shaped upper and lower plates, one each of said pair of end inserts being located at a respective outer lateral end of each of said elongated rectangular legs;

(ii) a corner insert adjacent each of said end inserts, the corner inserts having upper and lower plates each of which has a generally bar-shaped outer lateral end slidably engageable with said upper and lower plates, respectively, of an adjacent end insert, the inner lateral ends of said upper and lower plates of said corner insert having concave, arcuately curved section, and

(iii) a center insert having upper and lower plates curved to form an annular section, the outer radial edges of said plates slidingly engageable with said upper and lower arcuately curved inner sections, respectively, of an adjacent one of said corner inserts,

b. a matrix of resilient material molded around each said skeletal structure to form a composite structure having generally flat and parallel surface symmetrical about said central transverse symmetry plane, said composite structure having in plan view the general outline of said skeletal structure, said matrix having a front wall surface adjacent said front diametrical plane of said sealing element and parallel to but extending slightly away from the skeletal structure to which the respective matrix is molded, and

c. means for fastening said composite structure to a forceproducing member capable of applying a force normal to said front wall surface of said composite structure.

4,930,746

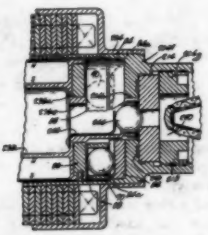
FLUID CONTROL DEVICE

Robert H. Reinicke, Mission Viejo, and Jefferson Y. S. Yang, Orange, both of Calif., assignors to Eaton Corporation, Cleveland, Ohio

Division of Ser. No. 147,829, Jan. 25, 1988, Pat. No. 4,892,286. This application Jul. 26, 1989, Ser. No. 385,748

Int. Cl.[5] F16K *31/10*

U.S. Cl. 251—129.11 **1 Claim**



1. A fluid control device comprising:

a housing having an inlet passage, an interior chamber communicating with said inlet passage, an outlet passage leading from said interior chamber, and a valve seat disposed in said outlet passage;

a brushless DC motor in said housing having a rotor supported in said interior chamber, bearing means providing for free rotary movement of said rotor and for free axial sliding movement independent of said rotary movement of said rotor in said chamber, openings in said rotor permitting fluid passage therethrough, said rotor carrying a poppet closing off said outlet passage from said interior chamber in a de-energized condition of said motor; and

intercooperating cam means comprising ramp means on either said housing or said rotor and ball bearing cam followers disposed in mutual engagement between said ramp means and a surface on the other of said housing or said rotor, said ramp means having a progressively increasing slope effecting variable axial translation relative to constant rotation of said rotor for moving said poppet away from said valve seat.

4,930,747

SOLENOID VALVE ASSEMBLY

Mamoru Nakamura, Chiryu, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Aichi, Japan

Filed Dec. 19, 1988, Ser. No. 285,984

Claims priority, application Japan, Dec. 18, 1987, 62-192222[U]

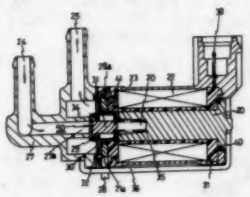
Int. Cl.[5] F16K *31/06*

U.S. Cl. 251—129.17 **1 Claim**

1. A solenoid valve assembly comprising;

a casing;

a magnetic core fixed to said casing;
a solenoid for supplying a magnetic flux to said magnetic core disposed about said magnetic core;
a disk-shaped elastic supporting member fixed to said casing at an outer circumferential portion thereof; and
a moving part supported on said elastic supporting member between a valve seat and the magnetic core and including a first member having a flanged portion located at a side



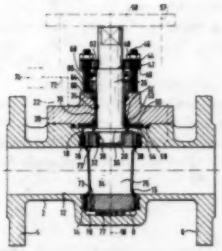
facing said valve seat, a second member made of an elastic material disposed in contact with said flanged portion on the side thereof facing said core and said elastic supporting member and a third member made of a magnetic material connected to said first member at an end thereof adjacent said core and covering an outer surface of said first member, said third member having a hollow cup-shaped configuration with an opening in a bottom central portion thereof engaging said end of said first member.

4,930,748

SHUTOFF AND REGULATING VALVE

Wolfgang Gonsior, Lindau-Bodolz, Fed. Rep. of Germany, assignor to Xomox International GmbH & Co., Lindau, Fed. Rep. of Germany

Filed Jul. 24, 1989, Ser. No. 384,207
Claims priority, application Fed. Rep. of Germany, Jul. 23, 1988, 3825116
Int. Cl.[5] F16K *5/02*
U.S. Cl. 251—163 **15 Claims**



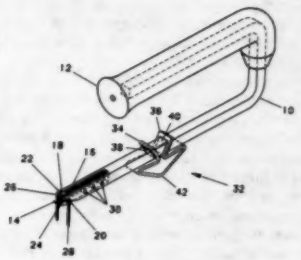
1. A shutoff and regulating valve comprising a rotatable stem; a shutoff element in the form of a stopcock mounted on said stem to rotate therewith; a housing in which said shutoff element is arranged; a housing cover through which said stem extends; a first sealing element for sealing said stem where it extends through said housing cover; a second sealing element arranged on the surface of said cover, and an annular disk for supporting said first sealing element on the underside of said cover.

4,930,749

STAPLE REMOVER WITH ADJUSTABLE LEVERAGE

Robert S. Lawrence, 344 State St., Fairfield, Calif. 94533

Filed May 15, 1989, Ser. No. 352,160
Int. Cl.[5] B25C *11/00*
U.S. Cl. 254—28 **4 Claims**



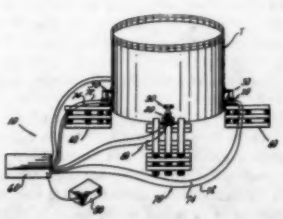
1. A staple remover comprising:
a shaft formed so as to have generally horizontal and generally parallel upper and lower portions which are spaced and interconnected by a verticle portion thereof;
a handle fastened to the upper portion of said shaft;
an upwardly curved blade which tapers to a thin, sharp edge at the end of the lower portion of the shaft;
a pair of side tines located on opposite sides of, and slightly aft of said blade, said side tines being upwardly curved in an arc similar to that of the blade except that the curvature of said arc turns conversely near the vertices of the side tines, said side tines ending slightly forward of said vertices with downward projections at their termini and;
an adjustable leverage means mounted on the lower portion of the shaft with the apex of said leverage means situated on the underside of the shaft;
whereby insertion of the blade of the staple remover under the bridge of an embedded staple contiguously with the exertion of pressure on the handle toward the work surface and rotation of the shaft about the apex of the leverage means can cause said staple to become gripped in the convergences of said blade and said side tines and be lifted thereby from its embedment, and thence be deflected toward the work surface.

4,930,750

APPARATUS FOR LIFTING TANKS

Bruno De Castro, 801 S. Bayshore Dr., Tower 4, Miami, Fla. 33131

Division of Ser. No. 142,125, Jan. 11, 1988, Pat. No. 4,807,851. This application Sep. 15, 1988, Ser. No. 247,242
Int. Cl.[5] B66F *1/08*
U.S. Cl. 254—89 H **5 Claims**



1. An inverted double action jack assembly for lifting loads

in combination with a plurality of log members stacked in criss-crossed arrangement comprising:

A. cylindrical housing having upper and lower ends and said lower end including an external threaded portion and further including two ports;

B. a rod member receivably within said housing and having lower and upper terminations;

C. sealing means mounted around said rod member so that two compartments are defined within said housing one of said compartments being connected to one of said ports and the other compartment being connected to the other port;

D. O-ring means sealably mounted between said rod member and said housing substantially towards said lower end and further including retaining means for keeping said O-ring means from coming out of said housing, and

E. a base member of sufficiently large dimensions to rest on said log members, having a central through opening and having an upperside and a bottom and said through opening including an internal threaded portion in the area adjacent to said upperside for cooperative engagement with said external threaded portion of said clyindrical housing and the rest of said through opening including an internal flange for complementary support of said housing.

4,930,751

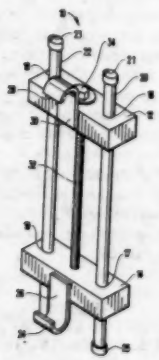
COIL SPRING COMPRESSING TOOL

Willie R. Hutchins, Rte. 2, Box 183, Greenville, Ga. 30222

Filed Aug. 21, 1989, Ser. No. 396,082

Int. Cl.[5] B25B *5/02*; B60P *1/48*

U.S. Cl. 254—10.5 **1 Claim**



1. A coil spring compressing tool, comprising:

first and second elongated blocks extending in spaced parallel relation;

a pair of aligned apertures formed through opposite ends of each of said blocks;

a pair of guide rods slidably received through said apertures;

an enlarged retaining stop at each end of each of said guide rods, said guide rods mounted for free axial independent sliding movement relative to each other and relative to each of said blocks within limits determined by said retaining stops;

a central bore formed through said first block;

a threaded bore formed centrally through said second block in coaxial alignment with said central bore;

an elongated threaded rod having a first end portion received for free rotation in said central bore and a second end portion in threaded engagement with said threaded bore, said threaded bore extending in parallel relation between said guide rods;

an enlarged driving head on said first end portion of said threaded rod for engagement with a wrench; and

a pair of oppositely directed hooks secured at central aligned positions on side faces of said first and second blocks, between said guide rods and in alignment with said threaded rod, said hooks dimensioned for engagement with a coil spring.

4,930,752

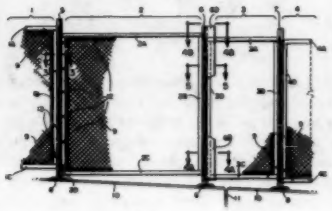
HIGHWAY FENCING

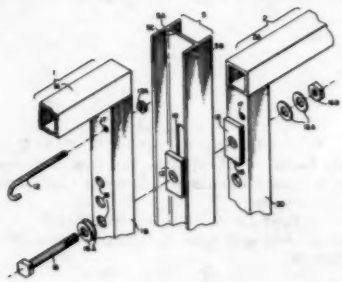
John F. Wolper, Jr., 395 First Ave., Phoenixville, Pa. 19460

Filed Jan. 13, 1989, Ser. No. 297,293

Int. Cl.[5] E01F *15/00*

U.S. Cl. 256—13.1 **17 Claims**





17. A fence comprising:

(a) a plurality of posts having an "I" beam cross section having opposing channels;

(b) a plurality of panels having end members, said end members positioned within said opposing channels of said posts;

(c) means for supporting said posts; and

(d) means for compressively fastening said panel members to one another and for compressively fastening said panel members to said posts whereby the combination of said panel members and said posts cooperate to resist bending moments caused by impact to the fence.

4,930,753

MOLDABLE EDGE CONNECTING APPARATUS

Alvin E. Alvyn, P.O. Box 450222, Miami, Fla. 33245-0222

Filed Aug. 10, 1988, Ser. No. 230,608

Int. Cl.[5] E04H *17/00*; F16C *11/00*; E05D *7/00*

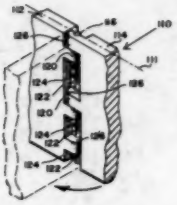
U.S. Cl. 256—26 **17 Claims**

1. In an improved edge connecting apparatus having connecting fingers respectively molded integrally with each segment to be connected, the improvement comprising:

a first segment having first connecting fingers in opposed pairs and defining therein half-round grooves coaxial with each other;

a second segment having second connecting fingers in opposed pairs and defining therein half-round grooves coaxial with each other, said grooves being not substantially deeper than their radius;

a joining rod having a rod axis coaxial with and passing through the half-round grooves of the connecting fingers of each segment, said rod axis being substantially coplanar with a midline disposed within sidewalls of at least one of the segments to be connected;



said first connecting fingers alternating with said second connecting fingers along the rod axis of the joining rod; and

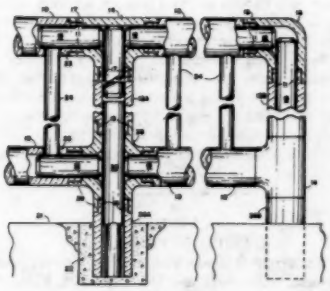
the connecting fingers of at least one segment having end surfaces radiused coaxial with the half-round grooves such that the segments can pivot with respect to each other about the rod axis as a hinge.

4,930,754

SECURITY RAILING

John L. Caron, 215D Denny Way, El Cajon, Calif. 92020, and Frederic Hoffmanns, 1485 Central Street, Merritt Island, Fla. 32957

Filed Dec. 27, 1988, Ser. No. 290,590
Int. Cl.[5] E04H *17/14*
U.S. Cl. 256—65 **10 Claims**



7. A security railing section comprising:

a horizontal top rail formed of polyvinyl chloride pipe;

a horizontal lower rail formed of polyvinyl chloride pipe, and having outer and inner diameters equal to the outer and inner diameters of said top rail;

a tee fitting formed of polyvinyl chloride having outer and inner diameters equal to the outer and inner diameters of said rails, said tee fitting permanently attached to each end of said lower rail;

a cross-fitting formed of polyvinyl chloride, each end thereof having outer and inner diameters equal to the outer and inner diameters of said rails, said cross-fitting permanently attached to each end of said lower rail;

a plurality of vertical posts having outer and inner diameters equal to the outer and inner diameters of said rails, first ones of said posts each having a first end permanently attached to a vertical end of said tee fittings, and a second end of each permanently attached to a first vertical end of said cross-fittings, and second ones of said posts each having one end permanently attached to a second vertical end of each of said cross fittings; and

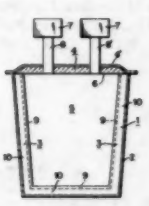
a plurality of solid, cylindrical reinforcing joint aligners formed of polyvinyl chloride to have an outside diameter essentially equal to the inside diameter of said rails, said posts, and said fittings, one of said aligners permanently disposed within each of said fittings and extending across each joint formed by said rails, said posts, and said fittings, said joint aligners serving to align and reinforce each of said joints.

4,930,755

METHOD FOR HEATING CERAMIC MATERIAL, PRIMARILY IN CONJUNCTION WITH THE USE OF SUCH MATERIAL IN METALLURGICAL PROCESSES, AND AN ARRANGEMENT FOR CARRYING OUT THE METHOD

Sven Ekerot, Minervavägen 19, 191 50 Sollentuna, and Jan Svennebrink, Järfälla, both of Sweden, assignors to Sven Ekerot, Sollentuna, Sweden

PCT No. PCT/SE86/00586, § 371 Date Jun. 27, 1988, § 102(e) Date Jun. 27, 1988, PCT Pub. No. WO87/04099, PCT Pub. Date Jul. 16, 1987
PCT Filed Dec. 29, 1986, Ser. No. 213,611
Claims priority, application Sweden, Dec. 30, 1985, 8506158
Int. Cl.[5] B22D *41/00*
U.S. Cl. 266—44 **23 Claims**



1. A method for pre-heating ceramic material used in metallurgical processes, said material forming part of a lining of a vessel and adapted to be contacted by molten metal melt, in the metallurgical process, said pre-heating being for reducing the magnitude of temperature changes occurring in the material as a result of the alternating presence and absence of molten metal, wherein pre-heating of said material lining the vessel is effected, by means of microwaves, so that the material has been and remains pre-heated when molten metal is being placed in the vessel, the vessel (1,11) including a primary major metallic casing part together with additional metallic casing components (4, 13, 19, 24, 26, 28) which, in conjunction with the primary casing part, complete the casing to form a microwave cavity around and required for pre-heating of said ceramic material, said cavity having at least one microwave generator (7) connected thereto and to provide microwaves into said cavity.

4,930,756

BURN TABLE

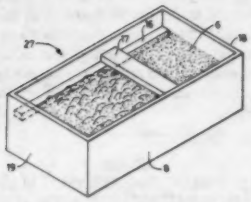
William N. Brenneke, Oswego, Ill., assignor to Caterpillar Inc., Peoria, Ill.

Filed Aug. 17, 1989, Ser. No. 394,915
Int. Cl.[5] B23K *7/00*
U.S. Cl. 266—49 **13 Claims**

1. A burn table adapted for supporting a workpiece beneath a cutting machine, comprising:

a tank having an open top and containing a liquid;

a bed of granular material in the tank, the bed having a substantially horizontal upper surface adjacent the top of the tank for supporting the workpiece; and



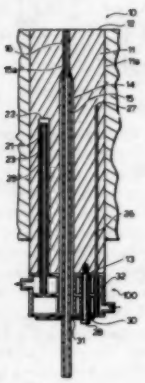
liquid level control means associated with the tank for normally maintaining a liquid level between the top of said tank and the upper surface of said bed of granular material during operation of said cutting machine.

4,930,757

TUYERE FOR METALLURGICAL VESSELS

Robert E. Manwell, and Charles A. Sutherland, both of Trail, Canada, assignors to Cominco Ltd., Vancouver, Canada

Filed Oct. 2, 1989, Ser. No. 416,198
Int. Cl.[5] C21C 5/48
U.S. Cl. 266—270 21 Claims



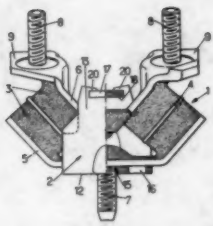
1. A tuyere for a metallurgical vessel comprising a tuyere body made of a solid metal; a gas feed bore through said tuyere body on its longitudinal axis; at least one gas feed pipe in said gas feed bore; at least one water-cooled bore in said tuyere body, said water-cooled bore being situated in and partly penetrating into said body parallel to and between the outer wall of said body and said gas feed bore and having a water passage for circulating water along the length of the water-cooled bore; a water cooling header attached-to said tuyere body external to said vessel; a water inlet and a water outlet in said cooling header; and means in said cooling header to communicate water from said water inlet to said water passage and from said water passage to said water outlet.

4,930,758

SUPPORT ELEMENT WITH MOVEMENT LIMITER, IN PARTICULAR FOR MOTOR VEHICLE ENGINES

Jean Poirier, Chateaudun, France, assignor to Hutchinson, France

Filed Feb. 28, 1989, Ser. No. 316,709
Claims priority, application France, Feb. 29, 1988, 88 02468
Int. Cl.[5] F16F 13/00, 1/36; B60G 11/22
U.S. Cl. 269—292 1 Claim



1. Support element with a movement limiter, made of a two-piece sheet metal construction, in particular for motor vehicle engines, of the type comprising:

(a) a resilient support with means for fixing it to both the body of the vehicle and the engine, and

(b) a movement limiter having an open U shape comprising a bottom to which are connected two flanges, thus allowing the positioning of said resilient support between said flanges, said movement limiter being fixed to the body by its bottom so as to limit the forward and rearward movements of said resilient support, these movements being produced respectively by the braking or acceleration of said vehicle, said support comprising a closure cross-brace providing a rigid connection between the ends of said flanges of the limiter, so as to transmit the acceleration and braking forces from one of said flanges to the other, thus avoiding the need for reinforcements of the metal sheet between said flanges and said bottom, wherein said cross-brace is formed by a metallic cut bar whose ends are crimped on the respective ends of the flanges of the movement limiter and wherein the ends of the flanges of the movement limiter each comprise two legs turned towards each other and forming a mortise, the corresponding end of the cross-brace comprising two facing notches, for introducing it into the respective mortise, said end of the cross-brace being crimped in the mortise by drawing said legs together.

4,930,759

CUTTING BOARD

Arthur C. Potter, 30 Brisbane House, The Fairway, Midhurst, West Sussex, GU29 9JE, and Deborah J. M. Eeles, "Treetops", Upper Springfield, Elstead, Surrey, GU8 6EQ, both of England

Filed May 23, 1989, Ser. No. 355,463
Claims priority, application United Kingdom, May 25, 1988, 8812435; Feb. 20, 1989, 8903834
Int. Cl.[5] B23Q 3/00
U.S. Cl. 269—54.5 14 Claims

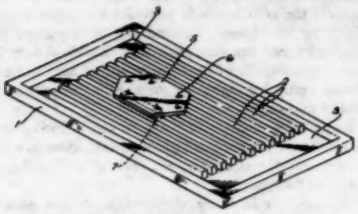
1. A cutting board for use in the cutting of bread, roasted meat and like foodstuffs comprising:

a baseboard having a surface for supporting the food during the cutting operation, the said surface being provided with a plurality of depressions comprising elongate channels for the temporary retention of food debris, and

a platform having retaining means to inhibit movement of food placed thereon, wherein

the platform is removably mountable on the baseboard and is provided with location means for the location thereof on

the said surface of the baseboard, the said location means comprising a plurality of projections on an under-surface



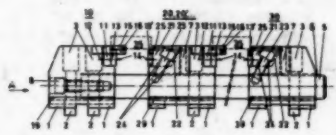
of the platform which projections are adapted to be received by the said channels for temporary retention of food debris in the baseboard.

4,930,760

MULTIPLE CHUCKING FIXTURE

Zivorad Mirkovic, Marktgasse 3, CH-8212 Neuhausen am Rheinfall, Switzerland

Filed Jan. 5, 1989, Ser. No. 293,336
Claims priority, application Switzerland, Jan. 5, 1988, 17/88
Int. Cl.[5] B25B 1/00
U.S. Cl. 269—99 8 Claims



1. A multiple chucking device for holding workpieces on a machine table, comprising:

a clamping block,

a middle clamping piece,

an end clamping piece,

a pair of guide axles, each having an axial flattened support surface,

said clamping block being rigidly supported on said pair of guide axles,

said middle clamping piece and said end clamping piece being mounted on said guide axles and being adjustably secured at selected longitudinal locations relative to said axles,

locking screws located in said middle clamping piece and end clamping piece for engaging each of said support surfaces to secure the middle clamping piece and the end clamping piece on said guide axles, wherein said pair of guide axles is replaceable, and are secured in the clamping block by removable fastening means,

said middle clamping piece and the end clamping piece each having a clamping jaw mounted in a recess,

an obliquely downwardly extending adjusting screw cooperating with each of said recesses and the clamping jaws to adjust a distance between the clamping jaw and the adjacent workpiece,

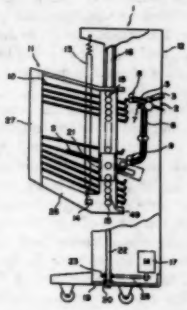
the clamping block, said middle piece and the end clamping piece each having a pair of upwardly facing horizontal retention surfaces, whereby the clamping jaws may be adjusted to clamp a workpiece in the chucking device and the device may be temporarily secured to the machine table by the retention surface.

4,930,761

CONTROL METHOD FOR SORTER WITH STAPLER

Masataka Naito; Takeshi Honjo, both of Kawasaki; Kenji Kobayashi, Tokyo; Jun Saito; Hironori Shido, both of Kawasaki, and Masakazu Hiroi, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 29, 1988, Ser. No. 225,803
Claims priority, application Japan, Jul. 30, 1987, 62-191935; Jul. 30, 1987, 62-191937; Aug. 7, 1987, 62-197786
Int. Cl.[5] B42B 2/00
U.S. Cl. 270—53 5 Claims



1. A method of controlling a sheet sorter wherein said sheet sorter includes a plurality of bins for accommodating sheets, the bins being arranged in a vertical direction, a first sheet discharging means for discharging sheets not to be sorted, second sheet discharging means, disposed with a vertical interval from the first sheet discharging means, for discharging sheets to be sorted, bin moving means for moving substantially vertically the bins and stapler means for stapling the sheets, said method comprising:

providing said stapler means adjacent to the second sheet discharging means;

accommodating the sheets on the plurality of bins by sequentially opposing the bins to said second sheet discharging means, and stapling the sheets on the bins by the stapler, when a sorting mode and a stapling mode are selected;

discharging the sheets by said first discharging means and accommodating them on a said bin when a non-sorting mode and non-stapling mode are selected; and

discharging the sheet by said second discharging means and accommodating them on a said bin, and stapling them, when the non-sorting mode and the stapling mode is selected.

4,930,762

PORTABLE ENVELOPE FEEDER

Wesley P. Kitchens, 13419 Pumice, Norwalk, Calif. 90650

Filed Jun. 16, 1988, Ser. No. 207,647
Int. Cl.[5] B65H 5/08, 1/18
U.S. Cl. 271—11 1 Claim

1. A portable feeder in combination with an offset printer, said feeder not being integral with said offset printer comprising:

a feed roller and a drive roller in said offset printer for receiving said envelopes, said drive roller cooperating with said feed roller;

at least one sucker rod attached to said offset printer having a suction cup mounted on the end of each rod and further having a manifold connecting to the sucker rod and hence the suction cup to a vacuum source, said sucker rod and said suction cup supplying said envelopes to said drive and feed rollers;

a translating bar connected to said scuker rods for conveying

said envelopes, said translating bar being driven by said offset printer;

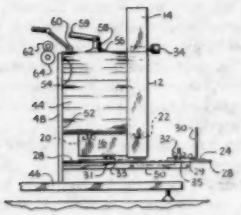
a height control bar that senses the height of said envelopes;

a platform synchronized with said offset printer mechanism that will move said envelopes upward in response to said height control bar as said envelopes are reduced by said envelopes being fed into said offset printer, said platform being perpendicular to a smooth vertical structure on said offset printer;

a sheet metal frame having a base, said base being a rectangular structure, having a first and second end, said structure being open on said first and second ends, said structure having a top piece, two side pieces and two bottom poieces connected to said two side pieces, said bottom pieces arranged to provide access to the bottom portion of said top piece, said top piece having two holes aligned to be on a centerline of said top piece and parallel to said side pieces;

first and second vertical rectangular members, each member having a top end and a bottom end, said first and second rectangular members being joined in a perpendicular relationship on one edge, the bottom ends of said first and second rectangular members being joined to one end of said base, said vertical rectangular members being perpendicular to said top piece of said base;

a first rectangular plate, having two holes therethrough, positioned on and a ligned with the holes in the top piece of said base, said first plate having fastening means to fasten said first plate to the top piece of said base, the



longitudinal dimension of said first rectangular plate being selected to match the longitudinal dimension of an envelope;

a second rectangular palte, positioned below and aligned with said base, and said second pale being adjacent to said bottom piece of said base, said second plate having holes therethrough, said second plate having hinge means connecting said second plate and the bottom end of said second vertical rectangular member;

a rectangular base plate positioned below and aligned with said second plate, said base plate having symmetrical slots along a centerline of said base plate and parallel to said second plate, said base plate having fastening means that fasten said base plate to said second plate, said rectangular base plate being attached to said platform by tightening at least one screw type clamp such that said frame is in a position where said feeding of said envelopes is accomplished, said rectangular base plate being detached from said platfrm by loosening at least one screw type clamp such that said frame is removed from said offset printer;

a stop composed of a vertical member and a horizontal member, said horizontal member being adjacent to and aligned with said second plate, said vertical member being perpendicular to said horizontal member and joined at one edge of said horizontal and vertical member, said horizontal member having a hole therethrough and fastening means that fastens said stop to said base plate with said second plate there between;

a vertical slot in the center of said second vertical rectangular member, said vertical slot having an offset at the upper end of said slot, said slot further containing a slidable weight equal distributed on each side of said second vertical rectangular member for holding said envelopes, whereby said slidable weight on the envelope side provides friction on the end of said envelopes and on the side opposite the envelope side provides a counterbalance to offset the movement induced by an envelope being gripped by said sunction cups, said slidable weight being place din said offset at the upper end of said slot in said second vertical rectangualr member when said frame is void of said envelopes;

said frame being swingable between an operative upright position and a loaded tilted position, said frame in a loaded tilted position rests against said vertical rectangular member of said stop;

said slidable weight being removed from said offset and placed on said envelopes while said frame is in aloading tilted position, said envelopes having said flap of said envelopes in the down position when printing on the front of said envelopes, said envelope flap being opposite said first vertical rectangular member, said envelopes having said flaps of said envelope in an up position when printing on the back of said envelope, said envelope flap being opposite said first vertical rectangular member;

said rectangular plate abutting a smooth vertical structure on said offset printer;

said rectangular base plate being adjustable to abut said smooth vertical surface on said offset printer.

4,930,763

PAPER FEEDING APPARATUS

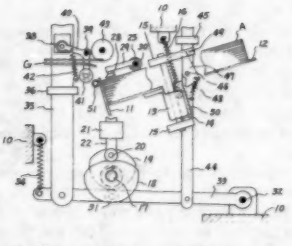
Yoshiyuki Horii, and Koji Oishi, both of Kyoto, Japan, assignors to Horizon International, Inc., Shiga, Japan

Filed Feb. 10, 1989, Ser. No. 309,093

Claims priority, application Japan, Feb. 18, 1988, 63-36401

Int. Cl.[5] B65H *3/08*

U.S. Cl. 271—31 **3 Claims**



1. A paper feeding apparatus comprising:

a frame;

a paper supply shelf with a stack of paper sheets, from which the uppermost paper sheet of said stack can be picked up; guide means which is mounted on said frame and to which said paper supply shelf is slidably engaged for movement of said paper supply shelf in a substantially vertical direction;

spring means for urging said paper supply shelf upwardly;

stop means engageable with the uppermost paper sheet of said stack for defining the upper limit of the movement of said paper supply shelf;

suction means movable between a first position in which said suction means is engageable with the uppermost paper sheet of said stack and a second position in which said suction means is retracted above from the top surface of said stack to pick up said uppermost paper sheet;

means for intermittently pushing down said paper supply shelf for a predetermined stroke against the urging force of said spring means, said means for intermittently pushing down said paper supply shelf comprising; a ratchet rack

fixed to siad paper supply shelf, said ratchet rack extending in parallel with the direction of the movement of said paper supply shelf; a pushing click engageable with said ratchet rack; a support for rotatably supporting said pushing click; means for actuating said support for vertically reciprocating movement with a predetermined stroke; a spring for urging said pushing click in a direction for engagement with said ratchet rack during the downward movement of said support; means for releasing said pushing click from engagement with said ratchet rack during the upward movement of said support;

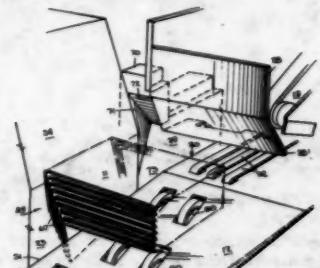
means for interlocking the movement of said suction means with the intermittently pushing down operation of said paper supply shelf, whereby when said suction means moves from said first position to said second position, said paper supply shelf is synchronously pushing down for the predetermined stroke against the urging force of said spring means.

4,930,764

FRONT END FEEDER FOR MAIL HANDLING MACHINE

Russell W. Holbrook, Ridgefield; Walter J. Kulpa, Trumbull, and James Morabito, Bethel, all of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.

Filed Dec. 28, 1988, Ser. No. 291,024
Int. Cl.[5] B65H *3/06, 3/46*
U.S. Cl. 271—119 **22 Claims**



5. Feeder apparatus for stacked articles comprising:

(a) a hopper region for receiving a stack of articles, said hopper region comprising a deck, a rear wall, and a side wall,

(b) transport means located in the hopper region for moving articles toward the side wall and in a downstream direction away from the rear wall, said transport means having a plurality of rollers whose axes of rotation form an acute angle with the side wall in such a manner that the rollers drive articles both in a forward direction as well as sideways toward the side wall, and,

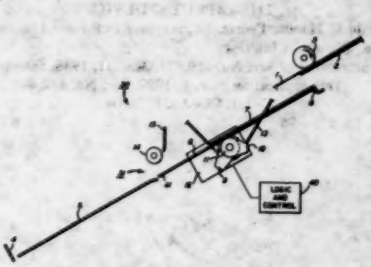
(c) said transport means and hopper region cooperating to cause said articles as they are moved downstream to assume a shingled configuration with lower articles in the stack being advanced downstream ahead of upper articles in the stack.

4,930,765

SHEET COLLECTION MECHANISM FOR STACKING LONG AND SHORT SHEETS

Steven M. Russel, Pittsford; James A. McGlen, Rochester, and Erik V. Anderson, Fairport, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 27, 1988, Ser. No. 290,329
Int. Cl.[5] B65H *31/04*
U.S. Cl. 271—214 **8 Claims**



1. A sheet collection mechanism for receiving and stacking in order a plurality of sheets, which mechanism is adjustable to receive and stack long, short and intermediate length sheets, said mechanism comprising

means defining a slanted receiving surface long enough to receive and support long sheets and having an upper end and a lower end,

a stop at the lower end of the surface for engaging sheets fed to the surface to form a stack extending toward the upper end of the surface.

means for feeding sheets to said surface through a path having an egress spaced from and above the upper end of said surface and located such that the leading edge of a long sheet exiting said egress engages a stack of long sheets at a position downstream of the trailing edge of the stack,

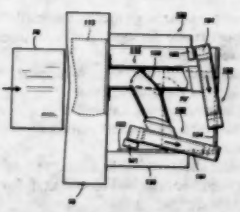
said receiving surface having upper and lower portions, the downstream edge of the upper portion being raisable from the upstream edge of the lower portion to cause the leading edge of a short sheet to engage a stack of short sheets at a position downstream of the trailing edge of the stack, and said upper portion including an upstream part the downstream edge of which is raisable independent of the rest of the upper portion for stacking intermediate length sheets.

4,930,766

PNEUMATIC COMPILING APPARATUS

Gerald M. Garavuso, Macedon, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Dec. 22, 1988, Ser. No. 288,492
Int. Cl.[5] B65H *31/26*
U.S. Cl. 271—220 **13 Claims**



1. A sheet stacking apparatus having a tray for receiving

sheets for stacking, comprising: registration wall means; and means for stacking sheets in the tray, said means for stacking sheets in the tray including a dual vacuum belt transport system having a first vacuum belt for driving sheets in a first direction into said registration wall means and a second vacuum belt for driving individual sheets transverse to said first direction so as to side register the sheets.

4,930,767

THERAPEUTIC DEVICE

Ronald L. Hanna, Peoria, Ill., assignor to Ronald Hanna, Peoria, Ill., a part interest

Continuation of Ser. No. 210,417, Jun. 21, 1988, abandoned. This application Nov. 6, 1989, Ser. No. 432,404

Int. Cl.[5] A63B *21/04*

U.S. Cl. 272—96 **8 Claims**

1. A therapeutic device for use on the lower leg of a human wearer so as to be attached to both the foot and about a portion above the calf and the knee of the leg, the therapeutic device comprising a foot engaging means having an upper portion and a lower portion both of fabric webs forming a foot engaging enclosure adapted to extend about and retain the ball of the foot; the lower portion of the foot engaging means forming an envelope and having an opening to allow the retention of an insert; an insert within the envelope; two stretchable side members of elastic material attached to said foot engaging means for extending from opposing sides of said foot engaging means along opposing sides of the calf of the wearer; the upper ends of said side members being joined to an upper strap portion by means which allow the side members to be selectively adjustable in length from the foot engaging means, said upper strap portion having sufficient length to allow placement of the strap portion around the leg of an individual user at an area just above the knee of the said user, and having means to fixedly secure the strap in that position around the leg.

4,930,768

VARIABLE RESISTANCE WEIGHT LIFTING EXERCISE APPARATUS

Thomas G. Lapcevic, 244 Carriage Ct., Wayne, Pa. 19087

Filed Nov. 10, 1988, Ser. No. 269,517

Int. Cl.[5] A63B *21/06*

U.S. Cl. 272—117 **13 Claims**

1. Weight lifting exercise apparatus comprising:

a. a support frame;

b. weight support carriage means vertically movable within said support frame for detachably securing a plurality of weight members;

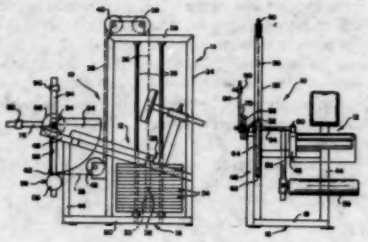
c. cable guide means fixed to said support frame above said weight support carriage means;

d. a cable segment means secured at one end to said weight support carriage means and extending through said cable guide means;

e. a horizontal shaft rotatably supported on said frame;

f. a bearing member attached to said shaft for engagement by a user to rotate said shaft;

g. a cable wheel rotatably mounted on said shaft and having a circumferential arc surface with the other end of said cable segment means attached to said cable wheel such that the rotation of said cable wheel causes said cable segment means to engage said circumferential arc surface to transmit force to said cable segment means to transmit vertical movement force to said weight support carriage means;



h. a first radial torque arm rotatably mounted on said shaft;

i. means for adjustably and non-rotationally coupling said first torque arm to said shaft at any of a plurality of radial positions; and

j. a first weight member supported on said first torque arm.

4,930,769

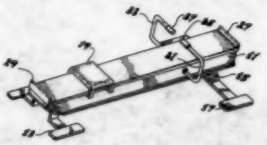
UNIFIED PULL-PUSH EXERCISE DEVICE

Joseph R. Nenoff, 1451 Wyoming Ave., Niagara Falls, N.Y. 14305

Continuation of Ser. No. 939,063, Dec. 8, 1986, abandoned. This application Jan. 28, 1988, Ser. No. 149,383

Int. Cl.[5] A63B *21/00*

U.S. Cl. 272—120 **8 Claims**



1. An improved portable exercise device capable of providing unified pullpush exercise for the user thereof and consisting essentially of:

(a) a single angled beam member having a flat top surface, an upper end and a lower end;

(b) a stationary outwardly extending base member positioned along said lower end of said beam member;

(c) an elongated adjustable support member positioned contiguous to said upper end of said beam member which controls the angle of the beam member; said beam member being angularly positioned at an angle of between about 10 and about 50 degrees between said base member and said elongated support member;

(d) a seat member moveably attached to and independently moveable over substantially the entire length of said flat top surface of said beam member; and

(e) A rigid, stationary gripping means securedly affixed to the sides of said beam member, said stationary gripping means being maintained in a rigidly fixed, spaced position above the upper half of said beam member, said gripping means being positioned a sufficient distance above said beam member to allow a person to position himself longitudinally along said beam member atop said seat member and below said gripping means, and while so positioned

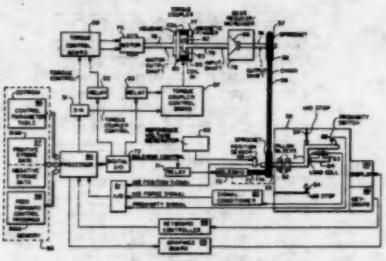
grasp said gripping means and while maintaining his hands in a substantially stationary position on said gripping means, move his body along substantially the entire length of said beam member changing between a protagonistic and an antagonistic exercise with substantially no transition therebetween.

4,930,770

ECCENTRICALLY LOADED COMPUTERIZED POSITIVE/NEGATIVE EXERCISE MACHINE

Norman A. Baker, 323 Oakwood Pl., Menlo Park, Calif. 94025

Filed Dec. 1, 1988, Ser. No. 278,671
Int. Cl.[5] A63B *21/24*
U.S. Cl. 272—129 **21 Claims**



1. A computerized exercise apparatus for providing positive and negative exercises comprising:

a movable user interface device (UID) for engaging a specific body part of a user;

driving means for generating a torque to drive said UID;

torque coupling means coupled to said driving means, wherein said torque coupling means couples torque from said driving means to said UID for selectively providing a resistive force to said UID in opposition to a contracting muscle of said body part and selectively applying a powering force to said contracted muscle of said body part;

mechanical coupling means coupled to said torque coupling means and said UID for transferring mechanical movement between said torque coupling means and said UID;

a processor coupled to said driving means, torque coupling means and said UID for providing control signals for operating said driving means; and torque coupling means;

a memory coupled to said processor for storing digital information used by said processor to control the operation of said driving means and said torque coupling means;

a position sensor coupled to said UID for providing UID position and direction information to said processor; and

a force sensor coupled said UID for determining amount of force applied between said UID and said user and providing said force information to said processor;

wherein said driving means and said torque coupler means regulates said UID in each of its direction of movement such that said resistive force operates against a force exerted by said user and said powering force is exerted against said user, wherein said resistive force and said powering force provided by said driving means and said torque coupler means are variable throughout a range of motion of said UID.

4,930,771

DEVICE FOR EXERCISING THE MID-BODY REGION

Charlie Wilson, 501 W. 25th St., Riviera Beach, Fla. 33404

Filed Sep. 14, 1989, Ser. No. 407,288
Int. Cl.[5] A63B *21/00*
U.S. Cl. 272—146 **4 Claims**

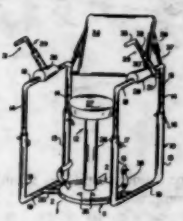
1. An exercise device comprising:

(a) a rigid framework comprising a bottom portion, opposed upright side portions and a rear portion,

(b) a platform mounted upon said bottom portion in centered relationship between said side portions and adapted to rotate in a horizontal plane about a vertical center axis,

(c) a stool mounted upon said platform and rotatable therewith, said stool being comprised of an upright support post and seating portion,

(d) opposed arm rests of adjustable height supported by said side portions,



(e) adjustable handgrips associated with said arm rests,

(f) a back rest associated with said rear portion and adjustably positionable with respect to elevation and angle of inclination, and

(g) paired foot engaging means disposed upon said platform in opposed relationship about said upright support post.

4,930,772

BASEBALL BAT

Michael Maloney, and Linda Watson, both of 4800 Oxborough La., Bloomington, Minn. 55347

Filed Oct. 31, 1988, Ser. No. 264,699
Int. Cl.[5] A63B *69/40*
U.S. Cl. 273—26 B **1 Claim**

1. An elongate bat for hitting having circular cross sections and a peripheral surface, comprising

(a) a handle end and a distal end, the handle end having a terminal edge and or a reduced diameter with respect to said distal end and a large diameter safety knob disposed terminally thereon opposite said distal end;

(b) the distal end having a pair of ball holders formed therein; and

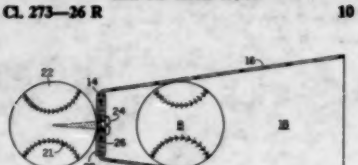
(c) the ball holders extending inwardly from the peripheral surface of the distal end, the first ball holder displaced a greater distance than the second ball holder from said terminal edge, the pair of ball holders further being located at the same radial position with respect to the central axis of the bat on the fact of the bat, and being spheric in shape, whereby a ball may be played by placing the ball in a ball holder raising and lowering the bat to place the ball in the air and hitting the ball with the bat.

4,930,773

CURVE BALL TRAINING DEVICE

James F. Outlaw, Rte. 1, Box 32C, Montalba, Tex. 75853

Filed Apr. 5, 1988, Ser. No. 177,611
Int. Cl.[5] A63B 69/00
U.S. Cl. 273—26 R 10 Claims



1. A device for training a pitcher to impart a curved trajectory to a ball, comprising:

a chamber having a cavity adapted to receive a projectile therein, said chamber further having a mouth for permitting insertion of sid projectile into said cavity and discharge of said projectile from said cavity; and

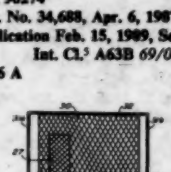
a grip member secured to sid chamber exterior to said cavity, said grip member having substantially the same size and feel to said ball, whereby a pitcher in training may use said device to emulate the wrist motion associated with throwing a curve ball.

4,930,774

BASEBALL PITCHING TRAINING APPARATUS

Gary J. Butcher, 4 Shady Vista Rd., Rolling Hills Estate, Palos Verdes, Calif. 90274

Division of Ser. No. 34,688, Apr. 6, 1987, Pat. No. 4,826,164.
This application Feb. 15, 1989, Ser. No. 311,139
Int. Cl.[5] A63B 69/00
U.S. Cl. 273—26 A 6 Claims



1. Baseball pitching training apparatus for defining an average strike zone, and for enabling one to practice pitching to selected locations contiguous to the outside edge of a strike zone, said apparatus comprising:

a base fabric encompassing said strike zone;

support means for vertically supporting said base fabric;

a first target area on said base fabric defined by a first elongate generally vertical rectangular opening at a position generally corresponding to a first selected vertical edge of said strike zone;

a second target area on said base fabric defined by a second vertically extending opening of substantially reversed L-shaped configuration and at a position generally corresponding to a second selected vertical edge of said strike zone, said first and second target areas being spaced apart on said base fabric one from the other with this space being, at least in part, an area corresponding to the center of the strike zone;

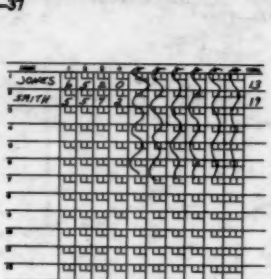
ball retaining means within each of said first and second target areas; said support means includes a horizontal support member and first and second vertical support members, each of said vertical support members having its upper end attached to a respective end of said horizontal support member and its lower end coacting with a support surface for supporting said apparatus, and said base fabric having its upper edge attached to said horizontal support member and being suspended in a substantially vertical plane.

4,930,775

METHOD OF PLAYING A BOWLING GAME

John R. Hoffman, Elburn, Ill., assignor to Brunswick Corporation, Skokie, Ill.

Continuation-in-part of Ser. No. 118,250, Nov. 9, 1987, abandoned. This application May 10, 1989, Ser. No. 350,087
Int. Cl.[5] A63D 3/00
U.S. Cl. 273—37 15 Claims



1. A method of playing a bowling game in which players are allowed at least one ball to knock down pins in each of a plurality of turns of play beginning with a given pin setup defining a first turn of play, said method comprising:

(a) requiring each player to deliver at least one ball in each of a succession of said given pin setups during the first turn of play until the player fails to knock down a given number of pins in one of the given pin setups;

(b) eliminating at least one pin from said given pin setup to define a subsequent turn of play;

(c) recording the number of consecutive pin setups a player knocks down said given number of pins in each turn of play;

(d) declaring the winner of the game to be the player having the highest score in terms of the number of times that player knocked down pins from the pin setups.

4,930,776

GAME BALL

Nelson F. Newcomb, Windleblo Rd., and Nelson F. Newcomb, Jr., Windleblo Rd., both of Mirror Lake, N.H. 03853

Filed Aug. 3, 1989, Ser. No. 389,228
Int. Cl.[5] A63B 39/00, 43/06
U.S. Cl. 273—58 B 8 Claims

1. A game ball useful for night play, said game ball comprising:

a hollow, lightweight, translucent plastic spherical shell, said shell having a substantially imperforate portion,

said shell further having a plurality of closely spaced perforations extending therethrough and providing a perforated zone characterized by surface openings,

all said perforations and openings being grouped in one portion of said ball surface to cause the wind-resisting characteristics of the surface of said ball to vary unsymmetrically, whereby said ball when spinning in flight will follow a curved path,

said shell further having disposed therein a ring-shaped, chemiluminescent light stick which, when activated, enables said ball to be sufficiently visible for play at night.

4,930,777

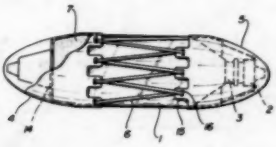
ELLIPSOIDAL-LIKE BALL

Robert J. Holenstein, R.D. 7, Box 659, Newton, N.J. 07860

Filed Aug. 7, 1989, Ser. No. 389,948

Int. Cl.[5] A63B *39/00*

U.S. Cl. 273—65 EC **19 Claims**



1. An ellipsoidal-like ball comprising:

a capped, plastic beverage bottle emptied of its beverage;

a pair of identical partial ellipsoid-like plastic end caps each disposed on a different end of said bottle; and

fastening means interconnecting said pair of end caps to secure each of said pair of end caps to said bottle.

4,930,778

RACKET FRAME

Shigeo Mizuno, Hamamatsu, Japan, assignor to Yamaha Corporation, Japan

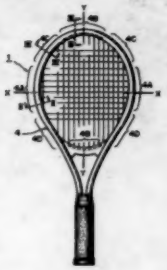
Continuation of Ser. No. 76,272, Jul. 22, 1987, abandoned. This application Jan. 4, 1989, Ser. No. 293,548

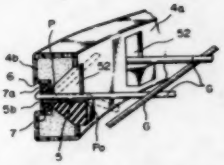
Claims priority, application Japan, Jul. 25, 1986, 61-114212[U]

Int. Cl.[5] A63B *51/10*

U.S. Cl. 273—73 D **4 Claims**

1. An improved racket frame comprising a head having inner and outer peripheral surfaces, said head extending in a predetermined plane, said head having a first side and a second side on either side of said predetermined plane and a plurality of string holes extending between said inner and outer peripheral surfaces, each said string hole having an opening which terminates at a point which is displaced outwardly from said inner peripheral surface and which is asymmetric in configuration with respect to said predetermined plane of said racket frame, and including an outwardly divergennt surface diverging outwardly from said predetermined plane on said first side of said head in a direction facing inwardly along said predetermined plane and a substantially planar surface parallel to said predetermined plane on said second side of said head, whereby first and second knots of vibration are provided in the directions of said first and second sides of said racket head, respectively, said first and second knots of vibration being displaced





from each other along said plane, and a plurality of strings held in tension on said head in engagement with said string holes.

4,930,779

APPARATUS FOR SELECTING RANDOM NUMBERS

Albert F. Maddox, 5725 Sands Point, Lakeland, Fla. 33809

Filed Mar. 27, 1989, Ser. No. 329,206

Int. Cl.[5] A63F *9/00*

U.S. Cl. 273—144 B **9 Claims**

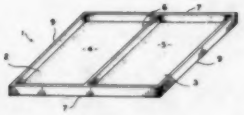
1. Apparatus for selection of a predetermined quantity from a plurality of random numbers for use in the playing of a lottery game comprising:

a plurality of numbered balls; and

a container for the number balls formed of a base, a hollow cover secured at its lower edge to the upper surface of the base and an intermediate member secured horizontally between the base and cover at an intermediate location, the intermediate member being formed with an angled slide extending from an elevated rear portion to a lower forward portion, the slide being of a size to simultaneously support a plurality of balls, the forward portion being formed with a trough for supporting a predetermined quantity of balls in a horizontal orientation whereby when inverted, the balls will move to the upper extent of the cover and when reverted the balls will roll down the slide to the lower extent of the cover onto the base with the

preselected quantity of balls being randomly received and supported in the trough for being read by the participant of the lottery game.

4,930,780
DICE GAME
Van R. Goodman, and Maxine Goodman, both of 2425 Jan Dr., Memphis, Tenn. 38127
Filed Feb. 27, 1989, Ser. No. 315,603
Int. Cl.[5] A63F 9/04
U.S. Cl. 273—146 7 Claims



1. A method of playing a dice game for two or more players utilizing a dice box, six dice and a score sheet which comprises the following steps:

(a) establishing by chance means an order of play whereby players are designated first player, second player and so one to a last player,

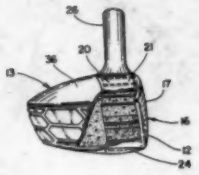
(b) initiating first stage of play by throwing said dice and playing in rounds beginning with said first player and ending with said last player whereupon each of said players in turn throws said line in an attempt to achieve sufficient score to enter a second state of the game,

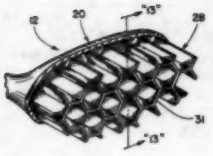
(c) continuing to play in rounds, said players who have entered said second stage of the game now throwing said dice to accumulate scores,

(d) each of said players must exceed the score of the previous player by a predetermined number of points in order to progress at the first or second stage of the game,

(e) playing a final stage and round which begins when one of said players reaches a predetermined high score, the remaining players playing to exceed this score to win.

4,930,781
CONSTANT RESONANT FREQUENCY GOLF CLUB HEAD
Dillis V. Allen, 240 Lincolnshire Ct., Schaumburg, Ill. 60193
Filed Aug. 17, 1988, Ser. No. 232,960
Int. Cl.[5] A63B 53/04; B22D 19/00; B22C 9/00
U.S. Cl. 273—167 F 12 Claims





5. A metallic club head as defined in claim 2, wherein the cover has a shape complementary to the forward wall so that it is substantially parallel thereto.

4,930,782
STRING TENSION TRANSMITTING APPARATUS
Randy D. Sines, Klamath Falls, Oreg., and Bruce W. Farber, Oakview, Calif., assignors to Karakal Corp. of the Americas, Ventura, Calif.
Continuation of Ser. No. 54,429, May 26, 1987, abandoned. This application May 24, 1989, Ser. No. 356,988
Int. Cl.[5] A63B 49/00
U.S. Cl. 273—73 D 44 Claims

1. A sports racket comprising:

a handle;

a racket head frame connected to the handle, the head frame being formed about a substantially planer string opening;

at least one rocker support surface on the head frame;

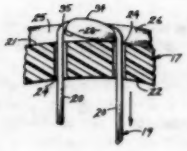
a plurality of string holes formed through the head frame from the rocker support surface into the string opening;

an elongated rigid rocker member having a longitudinal top side and a longitudinal bottom side opposed from said top side, each extending between opposing longitudinal ends on the rocker member; said rocker member being elongated to provide a length between the opposing longitudinal ends which is greater than a maximum thickness separating said top side and said bottom side;

string receiving means on the rocker member longitudinally engaging a racket string therein and positioning an engaged racket string over said opposing longitudinal ends of the rocker member in a pair of associated string chord sections; and

rocker means operably interposed between the rocker member and the rocker support surface for supporting the rocker member in a rockable relationship against the rocker support surface of the racket head and for transmitting tension between associated string chord sections of a

racket string engaged by the rocker member by rocking action of the rocker member relative to the rocker support



surface along a movable line of contact extending transversely across the bottom side of the rocker member.

4,930,783

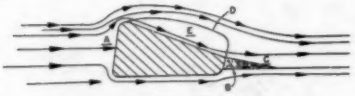
GOLF CLUB

Anthony J. Antonious, Towson, Md.

Continuation-in-part of Ser. No. 543,232, Oct. 21, 1983, abandoned, which is a continuation of Ser. No. 263,517, May 14, 1981, abandoned, which is a continuation-in-part of Ser. No. 134,985, Mar. 28, 1980, abandoned, which is a continuation of Ser. No. 896,594, Apr. 14, 1978, abandoned. This application Sep. 18, 1984, Ser. No. 651,716

Int. Cl.[5] A63B *53/04*

U.S. Cl. 273—164 **37 Claims**



1. A golf club head for a wood-type golf club to be swung at high velocities comprising:

a club head having a ball striking face, a rear face, a heel, a toe, a top surface and a bottom, the ball striking face being made to strike a golf ball and having a height which is at least 50% of the distance between the top surface and the bottom surface of the club head;

aerodynamic means for (1) raising the pressure at the rear of the club head and thus reducing the aerodynamic drag on the club head to provide greater acceleration for increased club head speed for a given force when swinging the club, (2) increasing the aerodynamic lift on the club head to provide a lighter swing feel, and (3) stabilizing the club head during its swing and at impact with the ball to provide improved directional control;

said aerodynamic means including an elongated, deep cavity having side walls and a bottom surface which form an air channel of sufficient depth and width to channel, retain and exhaust a high energy flow of air directly behind the club head;

said cavity being located in the top surface of said club head and extending substantially perpendicular to and rearwardly from adjacent said ball striking face to said rear face and forming two elongated top edges at the juncture with said top surface of said club head, said edges providing a stabilizing effect on the flow of air by defining flow lines independent of club head speed;

said cavity including an air flow restriction formed between said ball striking face and said rear face and serving to accelerate the flow of air through said cavity; and

said cavity having a depth of at least ¼ inch and a width of at least ¼ inch along a substantial portion of the cavity;

whereby the flow of high energy air through said cavity, when the club head is swung at high velocities, raises the pressure at the rear of the club head and acts as a vertical stabilizer which tends to maintain a square face alignment of the club head.

4,930,784

PORTABLE PUTTING WAFFLE GREEN

Rodney B. Jordan, P.O. Box 39, Florien, La. 71429

Filed Sep. 28, 1989, Ser. No. 413,626

Int. Cl.[5] A63B *57/00, 69/36*

U.S. Cl. 273—178 B **12 Claims**

1. A portable, artificial putting green comprising:

a. an artificial simulated grass mat, said mat having an upper and under side; and

b. a support layer formed to said under side of said mat, said support layer further comprising a plurality of individual supports, said supports suitably arranged and shaped as to allow said mat to conform to the underlying surface.

4,930,785

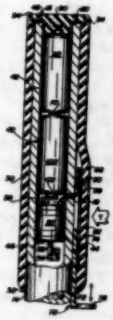
GOLF GRIP TRAINING APPARATUS

Paul A. Mills, Phoenix, Ariz., assignor to KCAP Manufacturing, Inc., Phoenix, Ariz.

Filed Sep. 5, 1989, Ser. No. 402,546

Int. Cl.[5] A63B *69/36*

U.S. Cl. 273—183 D **9 Claims**



1. Golf swing training apparatus comprising a golf club having a conductive hollow shaft, an upper end on the shaft, a

nonconductive grip on the shaft adjacent to said upper end and adapted to be gripped by a user's hands,

motor means disposed in said shaft and having a pair of electrical connections for providing electrical current to cause the motor means to run;

battery means for providing an electric current for the motor means;

circuit means for connecting the battery means to the motor means, including

first conductive means connecting the battery means to one of the pair of electrical connections of the motor means, and

second conductor means connecting the battery means to the shaft; and

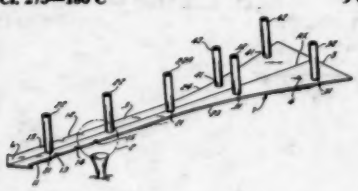
switch means connecting the other of the pair of electrical connectors to the shaft in response to undesirable thumb pressure of one of the user's hands while swinging the golf club.

4,930,786

GOLF CLUB SWING TRAINING DEVICE

Michael Bencriscutto, 6121 Golf Ridge Dr., Racine, Wis. 53402

Filed Apr. 24, 1989, Ser. No. 341,836
Int. Cl.[5] A63B *69/36*
U.S. Cl. 273—186 C **9 Claims**



1. A device for training both right- and left-hand golfers to initially move the head of a golf club in a straight line away from a golf ball and then along an inside curved backswing path at the beginning of a backswing, and after completing the backswing, to execute the downswing along an inside-straight swing path relative to an intended line-of-flight for the golf ball comprising:

a horizontal base member having a line-of-flight axis and including,

a forward portion having a front end and an intermediate interface, and

a rearward portion extending from said intermediate interface and having a back end;

a straight line set of spaced apart, vertically extending, yieldable pylons mounted on said forward portion to extend along a straight line parallel to said line-of-flight axis to said intermediate interface for a distance sufficient to provide a straight line vertical reference barrier that is laterally offset from the ball and extends rearwardly in said straight line from a point laterally offset from the toe of the golf club head placed to address the golf ball when the device is in position for use;

a right-hand curved set of spaced apart, vertically extending, yieldable pylons mounted on said rearward portion starting at said intermediate interface and extending along a curved line that flares smoothly outward away from said line-of-flight axis to said back end to define a first curved vertical reference barrier alongside of said inside curved backswing path for a right-hand golfer; and

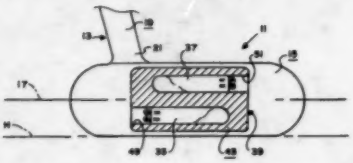
a left-hand curved set of spaced apart, vertically extending, yieldable pylons mounted on said rear portion starting adjacent said intermediate interface and extending along a curved line that flares smoothly outward from said line-of-flight axis and away from said right-hand set of pylons to said back end to define a second curved vertical reference barrier alongside of said inside curved backswing path for a left-hand golfer.

4,930,787

GOLF PUTTER INCLUDING SIGNALING DEVICE

Eugene R. Nobles, Jr., 4184 Gwynne Rd., Memphis, Tenn. 38117

Filed Aug. 31, 1989, Ser. No. 401,099
Int. Cl.[5] A63B *69/36*; G01C *9/06*
U.S. Cl. 273—186 A **8 Claims**



1. The combination with a golf putter of a signaling device, said golf putter including a putter head having a longitudinal axis and including a shaft having first end attached to said putter head and having a second end remote from said putter head for being gripped by a golfer; said signaling device comprising:

(a) a source of electrical energy;

(b) signal means for producing a signal when electrically energized;

(c) electrical circuit means for electrically coupling said signal means to said source of electrical energy; and

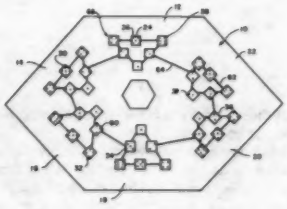
(d) switch means inserted in said electrical circuit means and movable between an open position in which electrical energy is prevented from passing from said source of electrical energy to said signal means through said electrical circuit means and a closed position in which electrical energy is allowed to pass from said source of electrical energy to said signal means through said electrical circuit means to electrically energize said signal means, said switch means being in said closed position when said longitudinal axis of said putter head is held at an angle unparallel to the horizon or when said putter head undergoes any clockwise or counterclockwise rotation on the backstroke.

4,930,788

GEM CAPTURE BOARD GAME

Frank Roccanova, 18 Roslyn Ct., North Patchoque, N.Y. 11772

Filed Mar. 31, 1989, Ser. No. 401,626
Int. Cl.[5] A63F *3/00, 9/04*
U.S. Cl. 273—248 **7 Claims**



1. A game set which includes:

a hexagonal game board having

six squares disposed in a triangular fashion adjacent to each side of said board, each square having dots thereon which correspond in number from one to six, said squares being connected to form playing paths, each side of said board, containing said six squares, being a zone

six different colors, with each color defining a zone

a plurality of game tokens;

a number die for controlling the movement of said game tokens along the playing paths;

a color die having said six different colors, one color on each side thereof;

a gem die having different gems, one on each side thereof; and a plurality of gem-shaped playing pieces corresponding to said different gems, each different gem corresponding to a different zone.

4,930,789

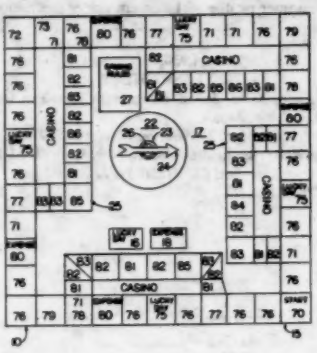
CASINO BOARD GAME

Diane F. Harris, and Ted D. Harris, both of 6421 S. Mullen St., Tacoma, Wash. 98409

Filed Sep. 20, 1988, Ser. No. 246,641

Int. Cl.[5] A63F *3/00, 3/08;* A63B *71/00*

U.S. Cl. 273—256 **2 Claims**



1. A gaming vacation simulation game for simulating a real-life gaming environment for two or more players, comprising:

(a) a plurality of playing pieces representing each player during the use of said board game;

(b) a playing board having a playing surface and including means defining preferably five separate playing paths on the playing surface, each playing path defined by a plurality of separate spaces serially linked, one of the playing paths defining a main path simulating events occuring when on a real-life gaming vacation; the other four playing paths defining a gaming path representing simulated gaming activities in a gaming room environment; the majority of the spaces of the main path being designated by an amount of rewards and penalties to be attributed to a playing piece upon termination of movement on such space and at least a few of the other spaces on the main path being designated as games of chance spaces, wherein said plurality of spaces among said other four playing paths being divided into a plurality of sets of spaces, a first set of spaces being distinguished by indicia to represent a first game of chance, a second set of spaces being distinguished by indicia to represent a second game of chance, a third set of spaces being distinguished by indicia to represent a third game of chance and a fourth set of spaces being distinguished by indicia to represent a fourth game of chance;

(c) a spinner means comprising a pointer and two interchangeable discs, both the obverse and reverse sides of each disc being radially divided into a plurality of areas, all the areas of the obverse side of a first disc only having indicia representing possible outcomes which occur from said game of chance, all the areas of the reverse side of said first disc only having indicia representing possible outcomes which occur from said second game of chance, all the areas of the obverse side of a second disc only having indicia representing possible outcomes which occur from said third game of chance, and all areas of the reverse side of said second disc only having indicia representing possible outcomes which occur from said fourth game of chance.

4,930,790

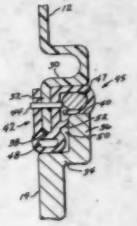
COMPOSITE COWL SEAL

Stephen E. Sheridan, Fond du Lac, Wis., assignor to Brunswick Corporation, Skokie, Ill.

Filed Jun. 14, 1988, Ser. No. 206,525

Int. Cl.[5] B53H *21/00*

U.S. Cl. 277—17 **6 Claims**



1. A composite cowl seal adapted for placement at a joint formed between first and second cowl sections which enclose the power head of a marine propulsion system, comprising:

a seal member adapted for attachment to one of said cowl sections at said joint, said seal member including a pocket disposed between facing surfaces provided on said first and second cowl sections and having outer surfaces abutting said facing surfaces; and

a resilient member disposed within said pocket for providing a water resistant seal between said cowl sections;

wherein portions of said seal member define said pocket when in a normally closed position for encasing said resilient member, and wherein said pocket defining portions of said seal member are movable to an open position for allowing insertion and removal of said resilient member to and from said pocket.

4,930,791

PLASTIC BORE SEAL

Tep Ungchusri, Woodlands, and Paul M. Earl, Houston, both of Tex., assignors to FMC Corporation, Chicago, Ill.

Continuation of Ser. No. 335,630, Apr. 10, 1989, abandoned. This application Oct. 2, 1989, Ser. No. 415,465

Int. Cl.[5] F16J *9/08, 15/32*

U.S. Cl. 277—151 **12 Claims**

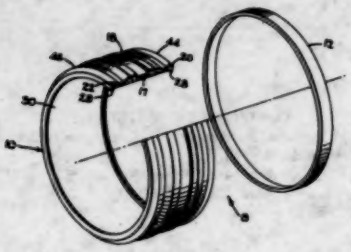
1. A plastic bore seal assembly for use as a static/dynamic seal in pipe connectors, pipe swivel joints and other piping devices, said assembly comprising:

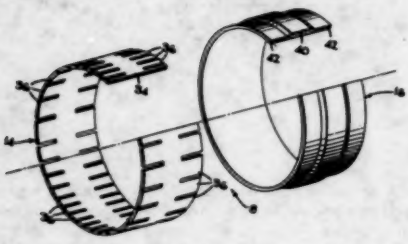
(a) a plastic seal sleeve having a bore, a central portion with an external annular groove, and two opposite end portions each including an annular sealing lip;

(b) an anti-extrusion ring surrounding the seal sleeve in the external groove; and

(c) at least one sleeve-like finger spring residing in the seal sleeve bore, said spring having a continuous annular portion and a plurality of spring fingers extending axially

from said annular portion, said spring fingers supporting a seal sleeve lip in its functional position and providing said





lip with a memory property that is not affected by high pressure and temperature cycling.

4,930,792

SEALING ARRANGEMENT POR AN ENGINE TIMING HOUSING COVER

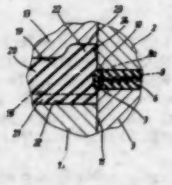
Roland Glück, Ludwigsburg; Otto Heilemann, Wernau, and Rolf Klingmann, Plüderhausen, all of Fed. Rep. of Germany, assignors to Daimler-Benz AG, Stuttgart, Fed. Rep. of Germany

Filed Nov. 28, 1988, Ser. No. 276,535

Claims priority, application Fed. Rep. of Germany, Nov. 26, 1987, 3740033

Int. Cl.[5] F16J 15/12

U.S. Cl. 277—235 B 4 Claims



1. An arrangement for sealing a stationary timing housing cover at the end face of an internal-combustion engine housing, wherein said engine housing comprises a cylinder head and a crankcase, said timing housing cover comprising a cylinder head side cover part and a crankcase side cover part, mutually adjacent sides of the cylinder head side cover part and the crankcase side cover part are constructed as a sealing surface, between which an elastomer profile seal element is retained under compressive stress, a downward projecting securing strip of the profile seal element is inserted into a corresponding receiving groove within the sealing surface of the crankcase side cover part, and an upward projecting sealing lug of the profile seal is located in a correspondingly constructed relief in the cylinder head side cover part, an end face of the elastomer profile seal element masks with its sealing lug an end face contact surface of the internal-combustion engine housing in the region of adjacent edges of the cylinder head and the crankcase, in a substantially rectangular separating space between the cylinder head and crankcase, a metal plate reinforced cylinder head gasket is provided within said separating space,

wherein metal support plate parts project laterally at an end face of the metal-plate-reinforced cylinder head gasket facing the timing housing cover, over which a flowable sealing medium of beadlike construction is applied and projects over an end face of the internal-combustion engine housing and is pressable into the separating space by the elastomer profile seal element under pretension.

4,930,793

KEYLESS CHUCK

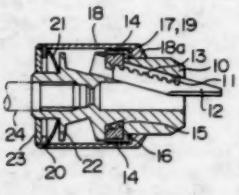
Takaharu Ando, Aichi, Japan, assignor to Emu-Esu Industrial Co., Ltd., Nishio, Japan

Filed Mar. 3, 1988, Ser. No. 163,542

Claims priority, application Japan, Nov. 9, 1987, 62-171905

Int. Cl.[5] B23B 31/12

U.S. Cl. 279—61 2 Claims



1. A keyless chuck comprising:

a body having an axis of rotation and a peripheral circular groove, one end of said body being adapted for attachment to a drive shaft and the other end of aid body being adapted to hold a tool;

means defining oblique holes in said body diverging uniformly inward from said one end and arranged symmetrically and at equal intervals about said axis;

tool-engaging jaws having threads thereon and slidable in said holes;

a nut rotatable in said peripheral circular groove in said body about said axis, said groove intersecting said holes and said nut being in threaded engagement with said jaw threads to advance said jaws to grip a tool on rotation of said nut in one direction or retract the same to release a tool on rotation of said nut inn the opposite direction;

a manually-grippable member loosely fitted about the outer periphery of said body for rotation about said axis and for relative longitudinal displacement therebetween;

opposed means on said nut and on said member interengageable on said relative longitudinal displacement between said member and said body in one direction to yieldably couple said member to said nut against relative rotation therebetween and disengageable to decouple said member from said nut on a predetermined relative torque between said member and said nut; and

spring means engaged between said member and said body to continuously urge, with a predetermined force, said relative longitudinal displacement therebetween in said one yieldable coupling direction, whereby rotation of said body in one direction or the opposite direction by a drive shaft will selectively advance or retract said jaws by manually restraining said member against rotation with

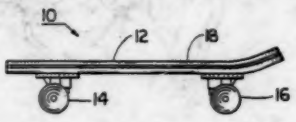
said body and when said jaws encounter a predetermined resistance to further advancing or retracting movement and thus effect said predetermined torque, said spring force is overcome and said opposed means disengage and decouple said member from said nut.

4,930,794

TOY SKATEBOARD WITH STEERABLE TRUCK ASSEMBLIES

David M. Chan, 401 E. Mission Dr., San Gabriel, Calif. 91776

Filed Aug. 29, 1988, Ser. No. 237,709
Int. Cl.[5] A63L *17/02*
U.S. Cl. 280—11.28 **5 Claims**



1. A toy skateboard comprising:
a platform having an undersurface;
two truck assemblies, each having a mounting aperture;
two longitudinally spaced mounting means for retaining said two truck assemblies on said platform adjacent said undersurface, one of said mounting means holding one of said truck assemblies and the other of said mounting means holding the other of said truck assemblies, each mounting means having:
a pivot projecting from said undersurface;
said pivot passing through said mounting aperture of said truck assembly radially retaining said truck assembly on said pivot; and
means for retaining said truck assembly axially on said pivot;
means for allowing each of said truck assemblies to be tilted in relation to its pivot;
a clockwise limit wall on said undersurface for each of said truck assemblies against which said truck assembly abuts when rotated in a clockwise direction about said pivot;
a counterclockwise limit wall on said undersurface for each of said truck assemblies against which said truck assembly abuts when rotated in a counterclockwise direction about said pivot; and
means for biasing each of said truck assemblies away from said undersurface including a leaf spring positioned between said truck assembly and said undersurface, said leaf spring including:
a body portion having a body plane;
three prongs projecting from said body portion substantially parallel to each other, each prong having a tip; and
said three prongs spaced when not under load in at least one of said following arrays:
said tip of the central of said three prongs spaced from said body plane on a first side of said body plane and said tips of the outer two prongs spaced from said body plane on a second side of said body plane opposite said first side;
said tip of said central of said three prongs positioned in said body plane and said tips of said outer two prongs spaced from said body plane on the same side of said body plane; and
said tip of said central prong spaced from said body plane and said tips of said outer two prongs positioned in said body plane.

4,930,795

ROTARY DISPLAY FOR SHOPPING CART

John M. Tannehill, 2890 Lansdowne Rd., Victoria, Canada (B.C., V8R 3P9), and John B. Tannehill, 507 Briarwood Dr., Enterprise, Ala. 36330

Filed Jul. 26, 1989, Ser. No. 385,852
Int. Cl.[5] B62D *39/00*; G09F *19/02*
U.S. Cl. 280—33.992 **15 Claims**

1. A manually propellable shopping cart for holding merchandise, comprising:
(a) a storage bin;
(b) a frame structure for supporting the storage bin;
(c) wheels mounted on the frame for rolling movement of the shopping cart during manual propellment;
(d) a rotary display apparatus for displaying printed matter, the rotary display apparatus including means for receiving replaceable printed matter;
(e) mounting means for rotatably mounting the rotary display apparatus on the shopping cart in an orientation to enable substantially the entire printed matter to be viewed from the rear of the cart as the cart is being manually propelled; and
(f) drive train means for rotating the rotary display means through manual propellment of a shopping cart, the drive train means:
having first coupling means associated with one of the wheels of the shopping cart to transmit torque from the wheel to the drive train means in a first rotational direction during propellment of the shopping cart in a forward direction and in the opposite direction during propellment of the shopping cart in the reverse direction; and
having second coupling means to transmit torque from the drive train means to the rotary display means to rotate the rotary display means in the first direction during propellment of the cart in the forward direction and to rotate the rotary display means in the opposite direction during propellment of a shopping cart in the reverse direction.

4,930,796

RIDING VEHICLE

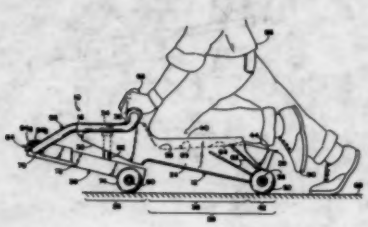
Lawrence R. Harrod, Fort Wayne, Ind., assignor to Krausco, San Francisco, Calif.

Filed Jul. 29, 1988, Ser. No. 226,141
Int. Cl.[5] B62M *29/00*
U.S. Cl. 280—87.021 **9 Claims**

1. An improved riding vehicle comprising:
a substantially deltoideus shaped frame having a longitudinal axis and including
a forward portion having a gooseneck-like upper surface and a downward sloping lower surface and including steering mechanism receiver means,
a central portion extending rearward from said forward portion, said central region portion including a seat region on an upper rider carrying surface having a seat with a concave cross section thereon, a knee pocket in the form of a depressed channel extending form said forward por-

tion through said seat region along said longitudinal axis, said knee pocket being bounded on either side by said seat region with a ridge extending the length of said knee pocket between the levels of said depressed channel and said seat region, and

a rear portion comprising the base of the deltoideus form and having rear, laterally outwardly facing wheel mounts at each corner thereof, said rear portion further including a foot ledge located adjacent the rear of the frame; and



a steering mechanism including

a handle bar;

an elongate handle bar mount secured at one end thereof to said handle bar intermediate the ends thereof;

wheel mounts rotatably mounted at the other end of said handle bar mount; and

attachment means fixed to said handle bar mount intermediate the ends thereof and received in said receiver means for fixing said steering mechanism to said frame.

4,930,797

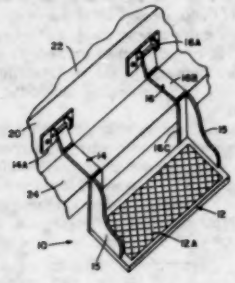
SAFETY STEP SYSTEM

Lee R. Parrill, 465 Jefferson St., Lander, Wyo. 82520

Filed Jun. 20, 1989, Ser. No. 368,779

Int. Cl.[5] B60R *3/02*

U.S. Cl. 280—166 **6 Claims**



1. A fold-out safety step system for a passenger van having a side door and and a floor, wherein said side door is movable between open and closed positions; said system comprising:

(*a*) a planar step member comprising a metal grate; said step member having first and second ends;

(*b*) first and second leg members secured to said first and second ends of said step member;

wherein said van includes a tread area which is recessed from said floor adjacent said side door and wherein a vertical wall extends between said floor and said tread area; wherein said leg members are pivotably mounted to said vertical wall in a manner such that said step member is pivotable between upward and downward positions when said door is in said open position; wherein when said step member is in said downward position it is lower than said floor and is in a horizontal plane; and wherein when said step member is in said upward position and said door is in said closed position said step member is enclosed within said van.

4,930,798

BICYCLE HANDLE ASSEMBLY

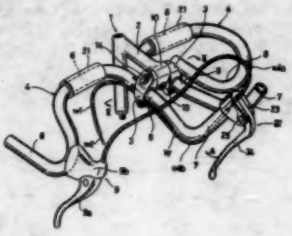
Toshimasa Yamazaki; Kazuyuki Miura, and Kazuto Yamasaki, all of Sakai, Japan, assignors to Maeda Industries, Ltd., Osaka, Japan

Filed Oct. 19, 1988, Ser. No. 259,912

Claims priority, application Japan, Nov. 13, 1987, 62-288160; Nov. 17, 1987, 62-291578

Int. Cl.[5] B62M *1/02*

U.S. Cl. 280—261 **25 Claims**



1. A bicycle handle assembly comprising a pair of side clamps provided on a handle stem, the side clamps being disposed substantially symmetrically around the stem, the stem being located on the longitudinally axis of a bicycle, and a pair of separate half handlebars respectively supported by said side clamps, wherein:

each half handlebar is made of a single integral piece,

each half handlebar includes a straight mounting portion extending longitudinally of the bicycle, on either side of said longitudinally axis, each mounting portion being held by a corresponding side clamp, a rest portion located behind said corresponding side clamp and extending laterally outward from said mounting portion to serve also as a first grip portion, and a second grip portion extending forward from said mounting portion to be located ahead of said corresponding side clamp, said second grip portion being grasped by a rider's hand while said rest portion support a rider's elbow, and

said mounting portion is adjustable in position relative to said corresponding side clamp so that said rest portion and said second grip portion are simultaneously adjusted in position longitudinally of the bicycle,

wherein each half handlebar further includes a third grip portion extending downward from said rest portion to provide a dropped grip.

4,930,799

TILTABLE TRAILER FOR MOTOR VEHICLES, ESPECIALLY PASSENGER CARS

Anund Pihlström, and Bernt Pihlström, both of Hudiksvall, Sweden, assignors to Systemvagnar AB, Upsala, Sweden

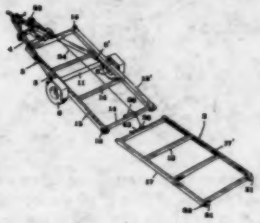
Filed Oct. 28, 1988, Ser. No. 264,054

Int. Cl.[5] B60P *3/06*

U.S. Cl. 280—400 **16 Claims**

1. A tiltable trailer for motor vehicles, especially passenger cars, comprising: a wheel-mounted chassis having at least one frame element (3) pivotable relative to a plurality of wheels (6) between a substantially horizontal travelling position and a backwardly-downwardly inclined position in which the rear portion of said frame element rests against the ground or base, said frame element (3) comprising longitudinal guide means (12, 12') along which a basic frame (2) is displaceable, said basic

frame being included in each of a plurality of different add-on units forming a series; locking means (20, 16) for securing, at least in said travelling position, said basic frame (2) to said pivotable frame element (3) said locking member (16) comprising: (i) two spring-loaded pivotal arms (30, 31), a main arm (30) adapted, in its locking state, to cooperate with a stop member (39) on said basic frame (2), and an auxiliary arm (31) adapted to normally secure said main arm in its locking position, said auxiliary arm (31) being, when said basic frame is hauled up on said pivotable frame element (3), moved aside to a position in which said main arm is free to yield away from said stop member (39) and allows it to enter into locking engagement with said main arm, and being, when said basic frame is pushed off from said frame element, manually settable in a position in which said auxiliary arm holds said main arm (30) in a turned-away position in which it is disengaged from said stop member; and, a winch transfer device (23), by means of which said add-on-unit can be hauled or otherwise conveyed up on said frame element in its inclined position from a position in which it stands on the ground behind said frame element, to a position coinciding with that of said frame element (3), in which latter position said locking means can secure said add-on unit to said frame element.

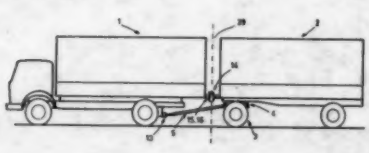


4,930,800

SHORT COUPLING WITH VARIABLE GEOMETRY FOR TRAILERS

Andre Jean-Luc, Dangolsheim, France, assignor to Lohr Industrie, Hangenbieten, France

Filed May 6, 1988, Ser. No. 191,102
Claims priority, application France, May 6, 1987, 8706536
Int. Cl.[5] B60D 1/02
U.S. Cl. 280—446.1 **7 Claims**



1. A coupling system defined between a truck vehicle and a trailer vehicle, comprising:

extensible rod means pivotably mounted upon said truck and trailer vehicles at opposite ends thereof and extensible between two relatively different lengths, a first length of which is defined by means of said truck and trailer vehicles when said truck and trailer vehicles are travelling in alignment with respect to each other under normal running conditions, and a second length of which is defined by means of said truck and trailer vehicles when said truck and trailer vehicles are disposed out of axial alignment with respect to each other under turning conditions; and

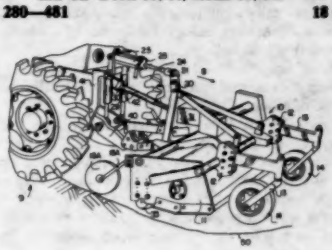
engageable/disengageable support means provided at laterally spaced corner regions of a rear surface portion of said truck vehicle and at laterally spaced corner regions of a front surface portion of said trailer vehicle for permitting said truck and trailer vehicles to engage each other by said support means and thereby define a predetermined distance between said truck and trailer vehicles when said truck and trailer vehicles are operating under said aligned normal running conditions, and for permitting said truck and trailer vehicles to disengage each other upon one side of said vehicles and for remaining engaged with each other upon the opposite side of said vehicles so as to define a vertically-extending corner-turning fulcrum axis, at said corner region of said opposite side of said vehicles, about which said truck and trailer vehicles pivot relative to each other under said turning conditions.

4,930,801

FRONT MOUNTED IMPLEMENT

Ronald D. Gilland, Cary, Ill., assignor to Mathews Company, Crystal Lake, Ill.

Filed Sep. 18, 1987, Ser. No. 98,483
Int. Cl.[5] B60B 39/00; A01B 59/043
U.S. Cl. 280—481 **18 Claims**



1. An implement adapted for connection to a front of a pushing vehicle comprising: the pushing vehicle having a vehicle three point hitch with two horizontally spaced forwardly extending vehicle lower hitch brackets defining two lower hitch points and a vehicle upper hitch bracket defining an upper hitch point, the implement comprising: an implement frame; at least one forward ground contacting rolling support means mounted to a forward portion of said implement frame; at least one rear ground contacting rolling support means mounted to a rear portion of said implement frame; two horizontally spaced implement lower hitch brackets rigidly mounted on a rear portion of said implement frame; each said implement lower hitch bracket mounted to a forward portion of a corresponding said vehicle lower hitch bracket; an implement upper hitch bracket secured to said implement frame at a rear portion of the implement, an adjustable link means having one end attached to said implement upper hitch bracket and an opposite end pivotally attached to said vehicle upper hitch bracket, and said adjustable link means allowing longitudinal floating displacement of said implement upper hitch bracket along an axis of said adjustable link means for maintaining said at least one .ear ground contacting rolling support means in continuous contact with the terrain while the pushing vehicle is in operation; and an implement hoisting hydraulic cylinder having one cylinder end pivotally secured to one of said vehicle lower hitch brackets and an opposite cylinder end secured to said vehicle upper hitch bracket.

4,930,802

TOE PIECE FOR SAFETY SKI-BINDING

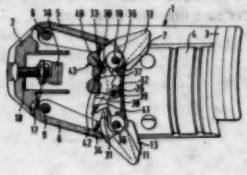
Gerhard Sedlmair, Farchant, Fed. Rep. of Germany, assignor to Marker Deutschland GmbH, Eschenlohe, Fed. Rep. of Germany

Filed Dec. 11, 1987, Ser. No. 131,744

Claims priority, application Fed. Rep. of Germany, Dec. 16, 1986, 8633619[U]

Int. Cl.[5] A63C *9/085*

U.S. Cl. 280—625 **4 Claims**



1. A toe piece for holding a ski-boot in a safety ski binding, said toe piece being pivotable against a biasing force when excessive side forces occur, said toe piece including:

a base plate;

a pair of elongated, generally parallel side members, each pivotally mounted at one end on said base plate;

coupling means pivotally connecting the other ends of said side members to each other to form a linkage, said linkage being laterally movable relative to said base plate about said pivotally mounted ends of said side member;

a detent mechanism under the influence of a biasing force for centering said linkage;

a pair of side boot holders pivotally connected to said coupling means, said side boot holders laterally holding the sole of a boot;

a lever centrally located relative to said side boot holders having end portions in operative engagement therewith, said lever being pivotally mounted on said linkage for movement therewith and being operative to maintain said side boot holders in a boot holding position when said lever is in a first position and to allow movement of a side holder to a boot releasing position when said lever is in a second position;

a housing member mountable to said base plate;

lever actuating means extending from said housing member, said lever actuating means being disposed in a fixed position relative to the longitudinal axis of said ski; and

control means on said end portions of said lever, said control means operatively engaging said lever actuating means wherein when said linkage moves beyond a predetermined distance from center, said lever moves from said first position to said second position thereby releasing said side boot holder on the side to which said linkage moves.

4,930,803

SUSPENSION LEG FOR A MOTOR VEHICLE

Günther Handke, Euerbach, Fed. Rep. of Germany, assignor to Fichtel & Sachs AG, Schweinfurt, Fed. Rep. of Germany

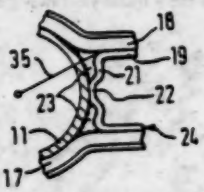
Filed Sep. 29, 1988, Ser. No. 250,908

Claims priority, application Fed. Rep. of Germany, Oct. 16, 1987, 3735043

Int. Cl.[5] B60G *3/02*

U.S. Cl. 280—668 **17 Claims**

1. A suspension leg (10) for a motor vehicle, comprising a container member (11) having an axis and two ends, shock absorber means (12) being housed within said container member (11), a piston rod (13) of said shock absorber means (12) passing in an axial direction through one of said ends, connection means (30, 24) being provided on said container member (11) adjacent the other of said two ends, said connection means (30, 24) being adapted for connecting a steering knuckle to said container member (11) and comprising a bracket (30) having a collar portion (17) surrounding said container member (11) over a major part of the circumference thereof, and two substantially parallel terminal leg portions (18) with respective inner side faces defining a gap therebetween, said connection means (30, 24) further comprising a substantially U-shaped insert member (24) inserted into said gap, said U-shaped insert member (24) having a bottom portion (21) and two side portions (19) with said bottom portion (21) being adjacent to said container member (11) within said gap and with said side portions (19) being attached to said inner side faces of said



terminal leg portions (18), interspace confining face portions (dotted) of said bottom portion (21), said container member (11) and said inner side faces confining at least one interspace (20), said at least one interspace (20) when regarded in said axial direction having a cross-sectional area such that said interspace confining face portions (dotted) are accessible to an anticorrosion surface treatment, said bottom portion (21) having along its total length thereof a distance from said container member (11) in a plane perpendicular to said axial direction, one single interspace (20) being defined between said bottom portion (21) and said container member (11).

4,930,804

INDEPENDENT WHEEL SUSPENSION FOR MOTOR VEHICLES

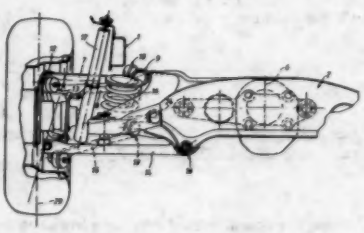
Peter Tattermusch, Esslingen, and Günter Bartel, Stuttgart, both of Fed. Rep. of Germany, assignors to Daimler-Benz AG, Stuttgart, Fed. Rep. of Germany

Filed Nov. 16, 1988, Ser. No. 271,865

Claims priority, application Fed. Rep. of Germany, Nov. 17, 1987, 3738964

Int. Cl.[5] B60G *3/00*

U.S. Cl. 280—690 **14 Claims**



1. An independent wheel suspension for powered rear axles of motor vehicles, having a wheel carrier and having an upper and lower linkage for this wheel carrier formed by individual links, in which, with respect to the forward driving direction, the lower linkage has a rear transverse link, as the spring link carrying the spring damper and/or the shock absorber, and a front longitudinal link extending diagonally toward the front inside, as the compression strut, the upper linkage is formed by means of a rear transverse link, as the chamber strut, and a longitudinal link extending toward the front, as the tension strut, and the linking points of these struts, on the wheel side, with respect to the longitudinal plane of the wheel center, are offset toward the inside, and in which a tie rod is provided

which extends in transverse direction of the vehicle and is offset with respect to the transverse plane of the wheel center, characterized in that the tension strut 8 and the chamber strut 7 of the upper linkage cross one another in the wheel side area such that the linking point 12 of the camber strut 7 at the wheel carrier 11 is located in front of the corresponding wheel side linking point 13 of the tension strut 8, and both linking points 12, 13 are located on different sides of the transverse plane 23 of the wheel center, and wherein when viewed in plan, the camber strut and the spring link extend approximately in parallel to each other and the tension strut and the compression strut extend approximately in parallel with each other, the angle, which is enclosed by the tension strut 8 and the camber strut 7 of the upper linkage and is open toward the vehicle center, when viewed in plan is located inside the angle enclosed by the compression strut 15 and the spring 14 of the lower linkage.

4,930,805

VEHICLE REAR SUSPENSION SYSTEM

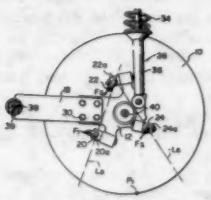
Naoto Takata; Seita Kanai; Nobuhiro Araki, and Tadashi Udo, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Division of Ser. No. 43,479, Apr. 20, 1987, Pat. No. 4,815,755, which is a continuation of Ser. No. 646,070, Aug. 31, 1984, abandoned. This application Nov. 3, 1988, Ser. No. 266,869

Claims priority, application Japan, Apr. 2, 1983, 58-161535; Sep. 2, 1983, 161536; Sep. 2, 1983, 58-161537; Sep. 2, 1983, 58-161538; Sep. 2, 1983, 58-161539; Sep. 2, 1983, 58-161541; Sep. 13, 1983, 58-168723

Int. Cl.[5] B60G 3/20

U.S. Cl. 280—690 **4 Claims**



1. In a vehicle rear suspension system for a rear wheel of a vehicle including a trailing arm having a wheel carrier portion having a rotational axis for a wheel and a swing arm portion pivoted to the vehicle through a resilient bushing, and lateral links each connected at an inward end to the vehicle and at an outward end to the trailing arm, the improvement comprising a toe angle control means for controlling the toe angle of the wheel, said toe angle control means comprised of a pair of the lateral links horizontally spaced apart, a camber angle control means for controlling the camber angle of the wheel, said camber angle control means comprised of one of the pair of lateral links comprising the toe angle control means and a third lateral link, single pivot means for pivotally connecting one end of said third lateral link to the vehicle and the other end of the third lateral link located above the pair of lateral links and forward of and above the rotational axis of the wheel, said first, second and third lateral links being connected to the trailing arm at points displaced from the rotational axis, and the swing arm portion and the wheel carrier portion preventing relative rotation between the swing arm portion and the wheel carrier portion about a horizontal axis, and shock absorbing means mounting the suspension system on the rear of the vehicle for absorbing shocks experienced during travel of the vehicle, said shock absorbing means being mounted to the suspension system rearwardly of the third lateral link.

4,930,806

VEHICLE SUSPENSION

James W. Walker, Jr., 125 Leavell Woods Dr., Jackson, Miss. 39212

Filed Feb. 27, 1989, Ser. No. 297,740

Int. Cl.[5] B60G 3/00

U.S. Cl. 280—701 **4 Claims**

1. A vehicle suspension, comprising a fore-and-aft frame, a fore-and-aft beam disposed alongside the frame and having first and second ends, pivot means disposed on the frame and operatively connected intermediate the ends of the beam for positioning the longitudinal axes of the frame and the beam in the same general horizontal plane and for operatively mounting the beam on the frame for receiving relative to the frame about a transverse axis, a ground-engaging wheel journalled on the second end of the beam relative to the frame, and first spring means operative between the top of the front end of the beam and a transversely aligned portion of the top of the frame for yieldingly resisting downward movement of the front end of the beam; a first support rigid on the first end of the beam and projecting laterally inwardly in spaced-above overhanding relation to the portion of the frame in transverse alignment with the first end of the beam and a first spring operative between said first support and said aligned portion of the frame in which the second spring includes a second support rigid on the frame in transverse alignment with the second end of the beam and projecting laterally outwardly in spaced-above overhanding relation to said second end of the beam, and a second spring operative between said second end of the beam and said support.

4,930,807

SEMI-ACTIVE HYDROPNEUMATIC SUSPENSION DEVICE AND AUTOMOTIVE VEHICLE EQUIPPED WITH THIS DEVICE

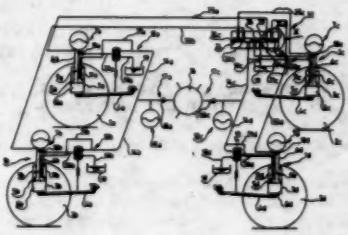
Henri Lachaize, Fontenay-Aux-Roses, France, assignor to Automobiles Peugeot, Paris and Automobiles Citroen, Neuilly Sur Seine, both of, France

Filed Dec. 30, 1988, Ser. No. 292,435

Claims priority, application France, Jan. 12, 1988, 88 00276

Int. Cl.[5] B60G 21/00, 11/04

U.S. Cl. 280—707 **20 Claims**



1. A semi-active hydropneumatic suspension device for an automotive vehicle of the type comprising a hydraulic cylinder associated with each of the wheels and provided with a main chamber connected through the medium of a damper with a main hydropneumatic accumulator, each hydraulic cylinder of the front axle, being equipped with a height corrector connected with a source of fluid under pressure through the me-

dium of a hydropneumatic compensating accumulator and with an outflow tank, and also with the main chamber of the hydraulic cylinder, whereas the rear axle is equipped with a height corrector controlling at least one of the hydraulic cylinders of this axle, wherein each of the hydraulic cylinders is provided with an annular chamber which is hydraulically connected with at least one hydropneumatic accumulator of the suspension, whereas the said height corrector of the rear axle is fed by a hydropneumatic compensating accumulator.

4,930,808

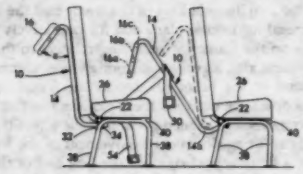
PASSENGER RESTRAINT SYSTEM

Joseph F. Mikoll, Hopkins, Minn.; Melvin M. Goldfein, 4515 Heathbrooke Cir., Minneapolis, Minn. 55422, and John M. Berner, Golden Valley, Minn., assignors to Melvin M. Goldfein, Minneapolis, Minn.

Filed Aug. 22, 1988, Ser. No. 234,623

Int. Cl.[5] B60R *21/00*

U.S. Cl. 280—751 **16 Claims**



1. A passive passenger restraint system for a vehicle comprising, a self-supporting restraining member of U-shaped configuration including a horizontally disposed laterally extending lap bar, connecting arms extending forwardly from the lap bar, pivots at the forward ends of the connecting arms supporting the passenger restraint and allowing the connecting arms and lap bar to swing up and down about said pivots, and a flexible restraining belt connected at each end to a fixed support means and encircling the restraint assembly whereby upon impact the resuling tension within the flexible restraining belt bends the connecting arms as the G-forces from the passenger are transferred to the lap bar and to the belt, the connecting arms are downwardly and forwardly inclined and said belt encircles both of said arms and is free to slide laterally across the front of each of the arms whereby upon impact the lap bar is thrown forwardly, thereby applying pressure to the belt such that the belt has a self-centering action upon the passenger restraint by distributing impact forces symmetrically on each side of the restraint to thereby center the restraint assembly during use.

4,930,809

TOWABLE UNIFIED FLOOR FRAME ASSEMBLY

Fred Lindsay, Darwin, Minn., assignor to Lindsay Industries, Inc., Seminole, Fla.

Filed Jan. 11, 1988, Ser. No. 142,555

Int. Cl.[5] B60P *3/32*; B62D *21/00*

U.S. Cl. 280—789 **30 Claims**

1. A readily towable unified floor frame assembly, comprising:

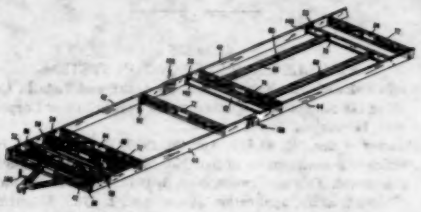
two elongate outer load-supporting beams disposed parallel to a longitudinal axis of said floor frame assembly, each of said beams having respective front and rear ends;

front and rear end members respectively connected perpendicular to said axis at said front and rear ends of said outer beams, defining therewith a perimeter of said floor frame assembly, said perimeter having substantially vertical inner and outer perimeter surfaces substantially defined by corresponding inner and outer surfaces of said outer beams and said end members;

carrier means comprising a carrier frame and axle means attached thereto for rotatably supporting a plurality of load-bearing wheels, said carrier means being shaped and sized to fit to said inner perimeter surface;

a plurality of first trusses normal to said outer beams and connected to said inner perimeter surface, said first trusses being disposed at predetermined locations inwardly of said front and rear ends of said outer beams so as to define therebetween a carrier receiving region that is free of said first trusses and within which said detachable wheeled carrier means may be received and securely attached to said floor frame assembly at said inner perimeter surface;

a plurality of second trusses normal to said outer beams and connected to said inner perimeter surface inside said carrier-receiving region, said second trusses each being formed with a plurality of vertical first gaps disposed symmetrically about said axis and each of a width sufficient to accommodate portions of said carrier frame therewithin;



a plurality of third trusses interspersed with said second trusses, normal to said outer beams and connected to said inner perimeter surface inside said carrier-receiving region, said third trusses each being formed with a plurality of vertical second gaps disposed symmetrically about said axis and each of a width sufficient to accommodate said load-bearing wheels of said detachable carrier means, whereby portions of said load-bearing wheels are partially contained within said second gaps and said floor frame assembly when said carrier means is attached to and supports said floor frame assembly on said load-bearing wheels;

a floor mounted atop and to said outer beams, said front and rear end members, said first, second and third trusses; and

hitch means securely attachable to and readily detachable from said inner perimeter surface for applying a towing force at said front end of said floor frame assembly.

4,930,810

TIMING DEVICE FOR SKIERS

Oswald G. Addison, Jr., 6809 Nashville Rd., Lanham, Md. 20706

Filed Mar. 20, 1989, Ser. No. 326,114

Int. Cl.[5] A63C *11/22*

U.S. Cl. 280—821 **5 Claims**

1. A combination grip and timing device for a ski pole, the

grip having an axis coextensive with the axis of the ski pole and having a free end; the combination comprising:

a recess within the free end of the grip, the recess having a land therein;

a timing display mounted in the recess for movement therein in an axial direction with respect to the axis of the grip toward and away from the land, the timing display being visible at the free end of the grip;

switch means operating the timing display and disposed within the grip inboard of the timing display for operation by the timing display upon movement of the timing display in the axial direction;

biasing means for biasing the timing display away from the switch means;

a plate within the grip, the plate having a first surface upon which the switch means is mounted facing the timing display with the biasing means disposed between the timing display and the first surface, and

means for retaining the timing display within the grip recess.

4,930,811

PROTECTING DEVICE FOR A PLASTIC FUEL TANK OF A MOTOR VEHICLE

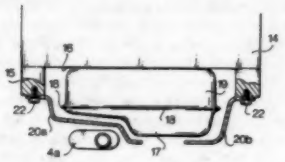
Teruhisa Tsukada; Masao Saito; Masao Fuse, and Nobuharu Sakon, all of Ohta, Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 8, 1988, Ser. No. 216,901

Claims priority, application Japan, Jul. 28, 1987, 62-115589; Jul. 28, 1987, 62-115591

Int. Cl.[5] B60K *15/02*

U.S. Cl. 280—834 **4 Claims**



1. A device for protecting a plastic fuel tank for an engine of a motor vehicle from flame, the fuel tank having a pinch-off portion, the device comprising;

a flame cutoff plate disposed between an exhaust gas passage member of the engine and a wall of the fuel tank spaced from said wall so as to cover said pinch-off portion of the fuel tank without contacting the wall of the fuel tank;

the flame cutoff plate is secured to the fuel tank;

a plurality of bosses fixed to a side wall of the tank by hot welding; and

said flame cutoff plate is fixed on the bosses by screws so as to cover the side wall including the pinch-off portion.

4,930,812

ADHESIVE LABLE OR LEAFLET ASSEMBLIES

Robin G. Howard, Suffolk, England, assignor to Denny Bros. Printing Limited, Suffolk, United Kingdom

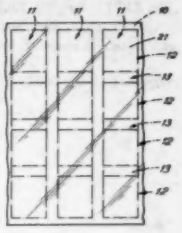
Filed Aug. 15, 1988, Ser. No. 237,076

Claims priority, application United Kingdom, Aug. 12, 1987, 8718217

Int. Cl.[5] B42D *19/00, 15/00*; B41L *1/20*; B32B *31/00*

U.S. Cl. 281—5 **8 Claims**

1. An adhesive label or leaflet assembly comprising a flexible carrier strip having one of its faces coated with a release material, and a plurality of labels or leaflets spaced from each other lengthwise of the coated face of the strip each of said labels or leaflets comprising a front sheet, a back sheet connected by one transverse edge thereof to the front sheet along a first fold line, and one or more further sheets disposed between the front and back sheets and connected to the back sheet along a second fold line, each label or leaflet being individually secured to said coated face by adhesive sheet means covering and adherent to the front sheet and to transverse bands of the carrier strip immediately adjoining the transverse edges of the label or



leaflet, and the transverse edge portion of the back sheet opposite said one transverse edge being tacked to the adhesive sheet means, and the lengthwise margins of the carrier strip extending laterally beyond the labels or leaflets and the adhesive sheet means.

4,930,813

RECIPE COLLECTION FOR COMPILING MENUS

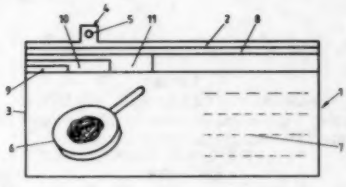
Volker Pudel, Max-Born-Ring 39, 3400 Göttingen, Fed. Rep. of Germany

Filed Sep. 12, 1988, Ser. No. 243,406

Claims priority, application Fed. Rep. of Germany, Sep. 17, 1987, 3731213

Int. Cl.[5] B42F *21/00, 21/02, 17/00*; A23L *1/00*

U.S. Cl. 283—39 **8 Claims**



1. A system for compiling menus and the like, comprising a collection of cards of the same format with each of said cards having a menu component disclosed thereon with said cards each having an upper edge portion, said cards each including on their upper edge portion at least one upwardly extending tab to be used for sorting purposes, each card bearing a stripe of a certain color with the color indicating that the menu component of the card is usually considered to be taste compatible with a meat disclosed on another card identified by the same or a compatible color, wherein said card (1, 12, 15, 22) includes ingredients and instructions for the preparation of each menu component thereon, and edge sealed opening (5, 15) in the region of the tab of each card, which is arranged in alignment with openings (5, 15) of other cards in the collection of cards with the cards which have aligned openings bearing menu components that are usually considered to be taste compatible, and a scale imprinted on each card with the size of the scale corresponding to the number of calories or the like contained in the menu component of the card whereby the scales of a selection of cards can be placed adjacent one another to visually indicate the number of calories to be present in a collection of menu components.

4,930,814

IDENTITY CARD

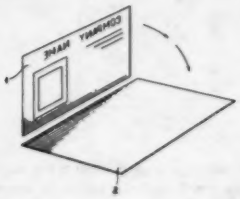
Hendrik W. Nunneler, Huizen, Netherlands, assignor to Joh. Enschede En Zonen Grafische Inrichting B.V., Haarlem, Netherlands

Continuation of Ser. No. 83,717, Aug. 10, 1987, abandoned. This application Apr. 17, 1989, Ser. No. 339,927

Claims priority, application European Pat. Off., Aug. 12, 1986, 86201413

Int. Cl.[5] B42D *15/00*; B44C *1/00*; B05D *5/00*; B32B *27/14*

U.S. Cl. 283—109 8 Claims



1. An identity card resistant to counterfeiting comprising a single sheet of a non-transparent synthetic material formed by applying a solution of at least one sublimable coloring agent, a thickening agent and a solvent to a side of at least one temporary support so as to display decorative patterns, graphics and text in a mirror reversed manner, pressing the side of the temporary support against at least one side of the sheet of synthetic material, and heating both the temporary support and the sheet of synthetic material so that the coloring agent is dissolved in, and bound to, the sheet of synthetic material, said identity card being able to have different images on both sides single of synthetic material.

4,930,815

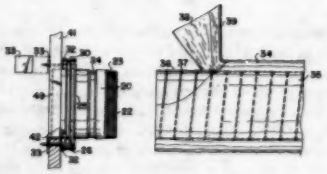
RING SEAL COLLAR FOR AIR DUCTS

William P. Tuggler, Jr., Jacksonville, Fla., assignor to Crown Products Company, Inc., Jacksonville, Fla.

Filed Feb. 2, 1989, Ser. No. 305,188

Int. Cl.[5] F16L *3/04*

U.S. Cl. 285—158 13 Claims



1. A ring seal collar for air ducts which comprises a thin walled tubular conduit body having circumferentially uninterrupted inlet end and an outlet end, an L-shaped channel ring having a bottom leg and an outer leg extending substantially parallel to said conduit body, said bottom leg being rigidly affixed to and around the outside of said conduit intermediate said ends with said bottom leg of said channel ring being adjacent said inlet end and the open side of said channel being adjacent said outlet end, said bottom leg having a plurality of spaced holes through which fasteners may be inserted for attachment to a main header of a conditioned air distribution system.

4,930,816

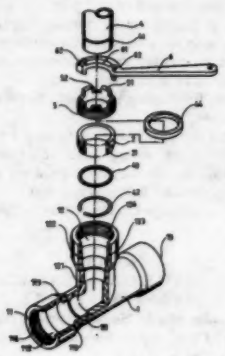
JOINING STRUCTURES FOR METAL PIPES

Hwang Biing-Yih, No. 89, Lin Yen South Road, Lin Yen Shian, Kaohsiung Hsien, Taiwan

Filed May 17, 1989, Ser. No. 352,933

Int. Cl.[5] F16L *21/04*

U.S. Cl. 285—321 2 Claims



1. A system for connecting pipes together comprising:

a joining structure for metal pipes, wherein each passage hole of a pipe fitting such as an elbow, a tee, etc., is provided with a blocking edge to hamper the end of a pipe to be joined, a larger diameter section at the outer end, a smaller diameter section at the inner section and a sloped surface between the larger diameter section and the inner smaller diameter section, said larger diameter section having female threads to screw with a inner threaded ring, a C-shaped ring to be fixed in a circumferential groove in a pipe to be joined, said C-shaped ring half buried in said groove and half protruding up the outer surface of the pipe, an anti-leak gasket to be fixed around the outer surface of the pipe, a metal ring being placed between the anti-leak gasket and the C-shaped ring and another metal ring being placed between the anti-leak gasket and the inner threaded ring, said anti-leak gasket having a sloped surface to correspond and contact with the sloped surface of the passage hole, said anti-leak gasket being set in the larger diameter section of the passage hole and possible to be compressed by the inner threaded ring when said ring is screwed more inward and to expand radially between the inner surface of the pipe fitting and the outer surface of the pipe.

4,930,817

STRUCTURAL PART COMPRISING A FLANGE AND AT LEAST ONE EXHAUST GAS TUBE, IN PARTICULAR EXHAUST GAS BEND, AND PROCESS FOR THE PRODUCTION THEREOF

Peter Fuchs, St. Aegyd, Austria, assignor to Vastag Automobiltechnik Gesellschaft m.b.H., Eisenwerk, Austria

Filed May 5, 1989, Ser. No. 347,741

Claims priority, application Austria, May 25, 1988, 1372/88

Int. Cl.[5] F16L *5/00*

U.S. Cl. 285—189 5 Claims

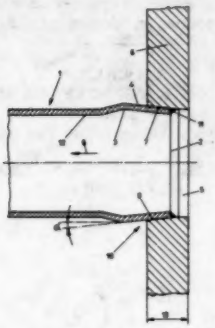
1. A pipe and flange assembly comprising a flange and at least one exhaust manifold in the form of an exhaust gas tube for an internal combustion engine, having an exhaust flow direction, and having a first end located within a perforation of the flange and being connected therewith by a welding seam arranged at an end rim of the exhaust gas tube;

the perforation of the flange and the first end of the exhaust gas tube being conically tapered with straight line genera-

trices having equal tapering angles (α) in opposite direction to the flow direction of the exhaust gases,

wherein the exhaust gas tube snugly engages at all sides of the wall of the perforation over at least part of the thickness of the flange;

wherein the exhaust gas tube contains an expanded cross section area located behind, as seen in the flow direction



of the exhaust gases, the tapered end of the exhaust gas tube into which a greatest cross section gradually passes over the greater cross section of the tapered end; and

wherein the size of a cross section within the narrowest area of the tapered end of the exhaust gas tube is at least equal to the size of a cross section within that area of the exhaust gas tube which is located, as seen in the flow direction, behind the expanded cross section area.

4,930,818

COMBINED CLOSING AND AIRING FURNITURE FOR A DOOR

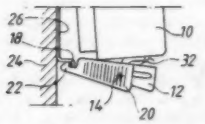
Sven L. Gerhardsson, Motala, Sweden, assignor to Aktiebolaget Electrolux, Stockholm, Sweden

Filed Mar. 30, 1989, Ser. No. 331,591

Claims priority, application Sweden, Apr. 20, 1988, 8801444

Int. Cl.[5] E05C 17/10

U.S. Cl. 292—29 **1 Claim**



1. In a closing fixture or latch for a door (10) comprising a handle (12) which is arranged on the door turnable around an axis (14), said handle being provided with a first hook (16) engaging a second hook (18) to keep the door in a closed position, a spring (32)

keeps the handle (12) with the first hook (16) in engagement with the second hook (18), the first hook (16) being arranged to disengage from the second hook (18) by the handle (12) with the first hook (16) being turned around the axis (14) against the action of the spring (32), the improvement wherein an element (20) arranged on the handle (12) and provided with a third hook (22) and being displaceable to two different positions on the handle, the third hook (22) in one of said positions (coincides with the first hook (16) and, together with the first hook (16), engages the second hook (18) to keep the door in the closed position and, in the second of said positions, the third hook (22) protrudes outside the first hook (16) and alone engages the second hook (18) to keep the door in an airing position.

4,930,819

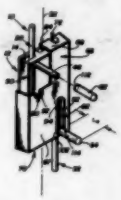
LATCHING MECHANISM

Douglas J. Sharp, Arlington, and E. W. Smith, Burleson, both of Tex., assignors to Doskocil Manufacturing Co., Inc., Arlington, Tex.

Filed May 20, 1988, Ser. No. 196,248

Int. Cl.[5] E05C 9/04

U.S. Cl. 292—42 **22 Claims**



1. A latching mechanism having utility in securing a door-like movable member in a closed position with respect to a stationary structure, comprising:

(a) a housing adapted to be mounted on the exterior of a door-like movable member for securing said movable member in a closed position with respect to a stationary structure, said housing having a front and a back and the back being generally planar to foster a low-profile mounting on the exterior of a door-like movable member, and the housing having a pair of spaced flanges extending forwardly from the back of the housing, and said flanges being configured to slidably receive and guide a pair of elongated appendages;

(b) a pair of elongated appendages having portions that extend through the flanges and outwardly away from said housing in a plane that is generally parallel to the plane of the housing back, and said appendages having distal ends which are adapted to engage structural portions of a stationary structure in order to hold a door-like movable member in a closed position;

(c) control means adapted to be manipulated for slidably moving individual ones of the pair of elongated appendages with respect to the housing, and at least a portion of said control means being in the form of a pair of rigid protuberances, each of the pair of protuberances being fixed to and projecting outwardly from a respective one of the two appendages, and each of said protuberances projecting from its respective appendage for a distance that is sufficient to permit operative engagement by a single digit of a person's hand so that a moving force may be applied to the protuberance to cause it to be manually translated, and the two protuberances being located within a space that is defined by the housing back and the two housing flanges, whereby the two protuberances may be manually caused to be moved toward one another in order to cause the distal ends of the two appendages to similarly move toward one another;

(d) biasing means for continuously urging the distal ends of each of the pair of elongated appendages away from the housing to respective positions where said distal ends may engage structural parts of the stationary structure; and

(e) a cover mounted on the front of the housing and at least partially enclosing said biasing means, and the cover having a plurality of openings, and certain of said openings being frontal openings and being sized and positioned to receive the protuberances, and others of said plurality of openings being non-frontal openings and being sized and

positioned to receive respective ones of the elongated appendages.

4,930,820

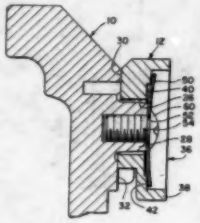
CAM HANDLE LOCK

Dona A. Pettit, and Gregory J. Vetter, both of Owatonna, Minn., assignors to Truth Incorporated, Owatonna, Minn.

Filed Oct. 16, 1989, Ser. No. 421,797

Int. Cl.[5] E05C *3/04*

U.S. Cl. 292—204 **10 Claims**



1. A cam handle lock having a base, a cam handle pivotally mounted on said base and a separate strike member for selective engagement by said cam handle, the improvement comprising, a shaped recess in said base, a thin metal washer in said shaped recess making a circular contact therewith inwardly of the periphery of said washer, and a threaded member capturing said washer and threaded into said cam handle to concavely deform said thin metal washer and cause said washer to function as a spring holding said cam handle tightly to said base.

4,930,821

COVER-LOCKING DEVICE FOR A VIDEO TAPE CASSETTE

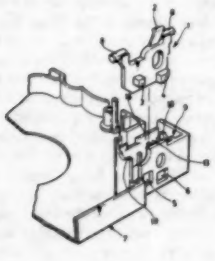
Hyo Keun Jang, Chungcheongnam-do, Rep. of Korea, assignor to SKC Limited, Rep. of Korea

Filed Jan. 17, 1989, Ser. No. 298,343

Claims priority, application Rep. of Korea, Aug. 18, 1988, 88-13472

Int. Cl.[5] E05C *3/14*

U.S. Cl. 292—228 **6 Claims**



1. A cover-locking device for a video tape cassette including a lower-half, an upper-half, and a chamber formed at a front portion of said lower-half at one side thereof, said cover-locking device comprising a cover-locking pin having lock-releasing and engaging protrusions extending from one side thereof, adapted to outwardly protrude through respective through-holes formed in said one side of said lower-half, and a pair of shafts laterally protruding from opposite upper sides of said cover-locking pin for pivotally supporting said cover-locking pin on support members disposed in said chamber, said cover-locking device further comprising

a spring member integrally formed on an upper surface of said cover-locking pin, said spring member extending upwardly and outwardly from the upper surface at an acute angle with respect to a direction normal to said upper surface in the direction at which said releasing and engaging protrusions protrude so as to be urged upon a side inner surface of said chamber when said cover-locking pin is supported on said support members.

4,930,822

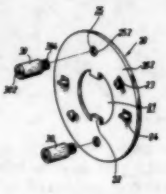
RETENTION PLATE ASSEMBLY FOR RETAINING A LOCK

Chao C. Shen, No. 233, Sec. 2, Hai Tien Rd., Tainan City, Taiwan

Filed Mar. 28, 1989, Ser. No. 329,684

Int. Cl.[5] E05B *15/02*

U.S. Cl. 292—357 **3 Claims**



1. A retention plate assembly for retaining a lock in a wooden door or a metallic door having at least a cylindrical bore therethrough for receiving the lock, and including a planar retention plate having a central cutout provided with a pair of opposed inwardly extending protuberances for engagement within corresponding recesses formed on the lock, the assembly comprising:

(a) a pair of radial tabs on the retention plate positioned on opposite sides of the cutout and disposable in a substantially horizontal plane perpendicuar to the plane of the retention plate when the radial tabs are engaged within a pair of corresponding slots formed on opposite sides of a door bore to prevent rotational movement of the retention plate;

(b) a pair of tangential tabs on the retention plate, the tangential tabs being positioned diametrically opposite each other across the cutout for engaging exterior edge portions of the door bore to prevent translational movement of the retention plate; and

(c) a pair of threaded holes extending through the retention plate and disposed on opposite sides of the cutout, and a pair of bolts, each bolt including a first threaded portion engageable within a threaded hole and a second portion for engagement within a corresponding hole provided in the door.

4,930,823

VEHICLE BUMPER

David Rivera, 18 Van Wert La., Walden, N.Y. 12586

Filed Jul. 19, 1989, Ser. No. 381,986

Int. Cl.[5] B60R *19/20*

U.S. Cl. 293—107 **8 Claims**

1. A vehicle bumper, comprising:

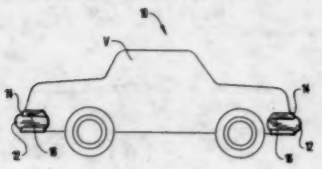
a shell member for attachment to an end portion of a vehicle; said shell member including an elongated hollow body having an elongated outwardly directed opening;

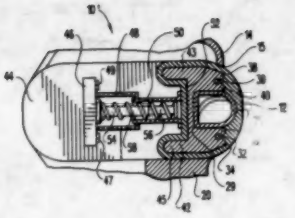
a movable impact member mounted for limited sliding movement within said shell member, said impact member comprising an elongated member having an outer portion dimensioned to extend partially through said outwardly directed opening;

spring means biasing said impact member outwardly from said shell member;

an inflatable air bag in said impact member;

a pair of parallel grooves extending along said outer portion of said impact member; and,





a resilient cover surrounding said impact member, said cover having a pair of inwardly extending ribs in frictional engagement within said parallel grooves.

4,930,824

GUTTER CLEANER

Thomas R. Matthews, and Garland B. Ricketts, both of South Boston, Va., assignors to Mercantile Enterprises, Inc., Halifax, Va.

Filed Apr. 28, 1989, Ser. No. 345,349

Int. Cl.[5] B25J *1/00*; E04D *13/06*

U.S. Cl. 294—19.1 **8 Claims**

1. An apparatus for remotely removing accumulated leaves and other debris from an overhead gutter of a building or the like, and comprising:

an elongate handle having one end adapted to be held by a user and a remote end adapted to reach adjacent a gutter;

a pair of co-operating fork-like jaws mounted to the remote end of said handle wherein each of said jaws has a greater width than height, said jaws comprising a stationary first jaw adapted to be positioned in an overhead gutter parallel to the longitudinal axis of the gutter, and a relatively pivotably movable second jaw extending lengthwise parallel to and substantially coextensive with said first jaw, said second jaw being adapted to move toward and away from said first jaw into closed and open positions, respectively, and said first jaw being adjustably mounted to the top of said handle to permit pivotal adjustment of the angle of said first jaw relative to said handle so as to facilitate use of said apparatus in gutters of varying height;

means for biasing said pair of fork-like jaws outwardly relative to each other into their open position; and

actuation means operable from said user end of said elongate handle for selectively moving said fork-like jaws into their open and closed positions;

whereby a user may position said pair of jaws lengthwise in an overhead gutter with said jaws in an open position and actuate them so as to move them together to a closed position to collect gutter debris therebetween for removal from the gutter.

4,930,825

APPARATUS FOR UPROOTING PLANTS

Timothy C. Dearman, P.O. Box 737, Mansfield, Tex. 76063

Filed Apr. 3, 1989, Ser. No. 331,842

Int. Cl.[5] A01B *1/18*

U.S. Cl. 294—50.9 **14 Claims**

1. Apparatus adapted for the uprooting of a plant comprising an elongate support terminating at one end in a first jaw and at its opposite end in a handle; a second jaw; means mounting said second jaw on said support for relative movements of said jaws between a first, open position and a second, plant gripping position; and actuating means for effecting said movements of said jaws, said actuating means comprising a grip, a link pivoted to said handle at a first point and to said grip at a second point, said grip being pivoted to a crank at a third point and said crank being pivoted to said handle at a fourth point, and force transmitting means coupling said second jaw to said crank, said actuating means being responsive to the application of force on said grip to move it in a direction toward said handle to rock said link and crank about the respective pivot points and enable said force transmitting means to move said jaws from said first position toward said second position, said pivot points being so positioned relative to one another that when said jaws are in their second position the force required to be exerted on said grip to maintain said jaws in said second position is minimal.

4,930,826

CARGO APPARATUS FOR ATTACHING A CARGO CONTAINER TO AN AIRCRAFT

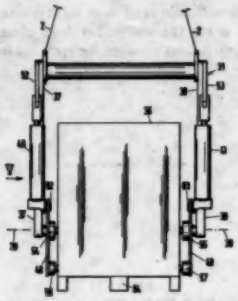
Beat H. Perren, Zermatt, Switzerland, and Albino Rossi, Gorla Minore, Italy, assignors to Air-Zermatt AG., Zermatt, Switzerland

Filed Jun. 16, 1988, Ser. No. 208,420

Claims priority, application Switzerland, Jun. 19, 1987, 2319/87

Int. Cl.[5] B66C *3/16*; A62C *31/00*

U.S. Cl. 294—68.27 4 Claims



1. A transport apparatus for attaching a cargo container (36) to an aircraft, in particular to a helicopter, comprising a U-shaped supporting frame (31) that is adapted to be attached to an aircraft, said supporting frame having a pair of arms (37, 38), a cargo container (36), horizontal pivot shaft means (65) attached to said pair of arms (37, 38), a holder (48, 49) for said cargo container (36), said holder having two retainer plates (48, 49) respectively connected to pivot about said horizontal pivot shaft means (65) on said pair of arms (37, 38) whereby the cargo container (36) held by said holder (48, 49) can be rotated about the horizontal pivot shaft means (65), at least four releasable connector elements (54–57), each of the connector elements consists of a mushroom-shaped part (60, 73) that is attached to the container (36), said mushroom-shaped part having a mushroom head (64, 76), and a part (63, 75) that accommodates the mushroom head (64, 76), in which the mushroom head (64, 76) can be introduced from above, supported below and at the sides, and from which it can be withdrawn upwards when the holder (48, 49) and the cargo container is in the rest position, two of said connector elements (54, 55) are arranged so as to be co-axial to the pivot shaft means (65), and the part (63) of the said two connector elements (54, 55) that accommodate the mushroom head (64) is rigidly connected to said pivot shaft means (65) on the arms (37, 38) of said pair of arms, at least two further of said connector elements (56, 57) are arranged above or beneath the first mentioned two connector elements (54, 55) when the cargo container (36) and the holder (48, 49) for said cargo container (36) is in the rest position, the parts (75) of the said two further of said connector elements (56, 57) that each accommodates a said mushroom head (76) of the connector elements (56, 57) are rigidly connected with one of the retainer plates (48, 49), and a drive system (40, 41) connected on said supporting frame (31) and connected to said holder to rotate said holder and cargo container (36) on said supporting frame (31).

4,930,827

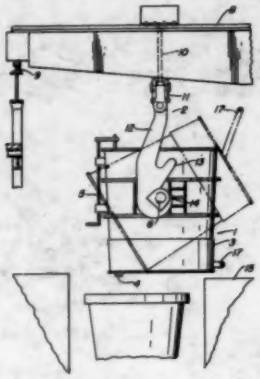
HOISTING HOOKS USED TO LIFT, TRANSPORT AND DUMP METALLURGICAL LADLES

Eugene L. Tihansky, Bethlehem, Pa., assignor to Bethlehem Steel Corporation, Bethlehem, Pa.

Filed Feb. 7, 1986, Ser. No. 827,039

Int. Cl.[5] B66C *1/28*

U.S. Cl. 294—81.56 1 Claim



1. A hoisting hook assembly for lifting a metallurgical ladle having a single pair of diametrically opposed trunnion pins, comprising a pair of parallel hook arms connected at their upper end to a bail, said hook arms each having an upper hook portion and a lower hook portion each in the shape of an arcuate recess extending inwardly from one edge of said hook arm and adapted to engage and disengage from said trunnion pins.

4,930,828

LOAD-SUSPENSION ARRANGEMENT FOR HOISTING APPARATUS

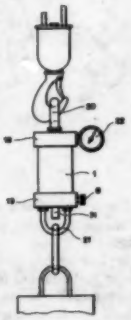
Charles Rérat, Courtedoux, Switzerland, assignor to Recomatic SA, Courtedoux, Switzerland

Filed Mar. 8, 1989, Ser. No. 320,542

Claims priority, application Switzerland, Mar. 24, 1988, 1107/88

Int. Cl.[5] B66C *1/34*

U.S. Cl. 294—82.15 10 Claims



1. An arrangement for suspending a load from hoisting apparatus, of the type comprising a cylinder having two ends, a piston disposed within the cylinder, hooking means provided

on the cylinder and on the piston for hooking either one to the hoisting apparatus and the other to the load, conduit means connecting the two ends of the cylinder, and adjustable flow-control means disposed in said conduit means, said conduit means permitting an incompressible fluid contained in the cylinder to flow through the flow-control means at a controlled rate of flow for displacing the piston within the cylinder at a constant rate, wherein the improvement comprises:

a piston rod composed of two coaxial rod portions,

a piston disk forming part of said piston and integral with said rod portions,

two end flanges forming part of said cylinder and including respective guide apertures, and

fluid-tight means associated with each of said apertures, each of said piston rod portions traversing one of said apertures.

4,930,829

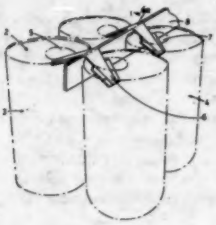
EMPTY CAN CARRIER

J. Rene Paulson, P.O. Box 334, Lachute, PQ J8H 3X5, Canada

Filed Sep. 20, 1988, Ser. No. 246,681

Int. Cl.[5] B65D *71/00*

U.S. Cl. 294—87.2 5 Claims



1. A device for carrying empty beverage cans that have an opening in a top plate thereof comprising:

an elongated planar body, and

a plurality of hook means attached to said planar body wherein,

each hook means includes an elongated, generally trapezoidal central section having converging side edges, a pair of elongated generally rectangular flap members, each attached to a respective side edge of said central section along a fold line, and slit means extending along each said fold line over a short distance from an inner end edge of the adjacent flap member;

whereby said flap members of each hook means are foldable inwardly along said fold lines to facilitate insertion of said hook means into a can through the opening thereof, and following insertion said flap members will open outwardly to capture said can top plate on the hook means between said planar body and the inner end edges of the flap members.

4,930,830

BOX BLANK HOLDING DEVICE IN BOX-MAKING MACHINE

Daigoro Toriyama, Chiba, Japan, assignor to Tanabe Machinery Co., Ltd., Tokyo, Japan

Filed Feb. 10, 1989, Ser. No. 309,346

Int. Cl.[5] B66C *1/42*

U.S. Cl. 294—88 3 Claims

1. A box blank holding device for a box-making machine, comprising:

a holder main body;

a fluid actuated cylinder mounted on said body;

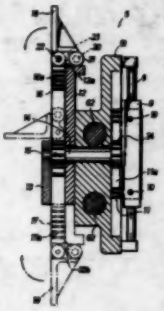
a reciprocally movable driving rack connected to said cylinder and moved by the supply and discharge of fluid to and from said cylinder;

a transmission shaft rotatably supported on said holder main body and having a pair of pinions, one of said pinions being in meshing engagement with said driving rack;

a pair of holding member-actuating racks disposed on either side of the other pinion on said transmission shaft in meshing engagement with said other pinion;

retracting-and-projecting guide plates mounted on said holder main body; and

a pair of holding members pivotally mounted on the ends of said holding member-actuating racks and engaged with and guided by said guide plates for being projectable into positions in which they are in spaced opposed relationship as said holding member-actuating racks are moved toward said transmission shaft for gripping blanks therebetween and for being retractable as said holding member racks are moved away from each other;



wherein each of said guide plates has a guide portion on the end thereof projecting away from the direction of projection of said holding members, and said holding members each have a roller thereon in rolling engagement with the corresponding guide portion, said device further comprising means for retracting said pair of holding members, said means comprising a resilient member engaging each holding member for urging the holding member to pivot in the retracting direction, whereby when each of said holding member-actuating racks is moved toward said transmission shaft, each of said rollers moves along the corresponding guide portion and then along the corresponding guide plate so as to cause each of said holding members to project, and when said holding member-actuating racks are moved away from said transmission shaft, when said rollers reach the respective guide portions, said holders are urged to pivot to the retracted position by said resilient members to cause said rollers to move along the corresponding guide portions.

4,930,831

SIDE EXTENSION FOR A TOY WAGON

Richard A. Valiga, Bartlett, and Richard S. Hart, Elgin, both of Ill., assignors to Radio Flyer Inc., Chicago, Ill.

Filed Dec. 9, 1988, Ser. No. 282,375

Int. Cl.[5] B62B *3/02*

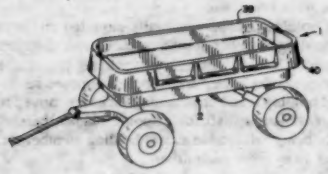
U.S. Cl. 296—26 13 Claims

1. A side extension for use with a conventional toy wagon of the type having a planar bottom portion and an upstanding wall having a perimeter defined by front, back and side port is extending from said bottom portion to define a passenger compartment, the side extension comprising means for increasing the depth of the passenger compartment and including:

(a) a first extension wall portion mounted to a portion of said perimeter and extending upwardly beyond the front, back and side portions;

(b) a second extension wall portion mounted to another portion of said perimeter and extending upwardly beyond the front back and side portions;

(c) wherein a lip is defined by said perimeter, and wherein said first and second extension wall portions include means for engaging the lip;



(d) said means for engaging said lip comprising a groove defined by the respective wall portions into which said lip is inserted; and

(e) means for securing the first extension wall portion to the second extension wall portion such that said side extension circumscribes the area defined by the front, back, and side portions to thereby increase the depth of the passenger compartment.

4,930,832

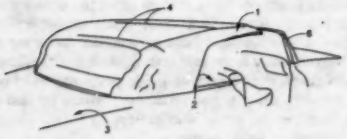
PUNCTURE AND TEAR RESISTANT ARMORED CONVERTIBLE TOPS FOR AUTOMOBILES

Robert Shelton, 898 Wabash Ct., Claremont, Calif. 91711

Filed Jan. 18, 1989, Ser. No. 298,161

Int. Cl.[5] B60J 7/12

U.S. Cl. 296—107 8 Claims



1. In a vehicular convertible top having

a support frame including support members that are moveable between a lowered position exposing the interior of the vehicle and a raised position over the interior of the vehicle; and

a flexible planar material, affixed to the support frame for moving therewith, for shielding the interior of the vehicle in the raised position of the support members, an improvement comprising:

chain mail, substantially coextensive with the flexible planar material and affixed to the support frame for moving therewith, for resisting forceful penetration of objects between the exterior and interior of the vehicle through the flexible planar material; and

first affixation means for affixing the chain mail to the support frame.

4,930,833

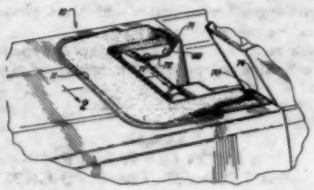
BOOT COVER FOR A CONVERTIBLE VEHICLE

Richard Cichoski, Sterling Heights, and Michael Kilpinen, Northville, both of Mich., assignors to ASC Incorporated, Mich.

Continuation-in-part of Ser. No. 100,530, Sep. 24, 1987, abandoned. This application Mar. 3, 1989, Ser. No. 319,320

Int. Cl.[5] B60J 7/20

U.S. Cl. 296—136 8 Claims



1. A boot cover for covering a convertible top storage compartment of a convertible-type vehicle, comprising:

(a) a main body portion;

(b) a border molding attached to an edge of the main body portion, the border molding comprising:

(1) an attaching flap;

(2) a hinge portion extending from the attaching flap and which is extensible and retractable to allow flexibility to the molding, the hinge portion comprising a substantially U-shaped cross-section; and

(3) means for disengagably attaching the molding to a surface of a convertible-type vehicle adjacent a convertible top storage compartment.

4,930,834

FABRIC TAILGATE FOR A PICKUP TRUCK

Stephen J. Moore, 2076 E. Lamesa, Yuma, Ariz. 85364

Filed May 26, 1989, Ser. No. 357,161

Int. Cl.[5] D62D 25/00

U.S. Cl. 296—50 6 Claims

1. A fabric tailgate for a pickup truck having a cragо carrier with a bed, sides and a front enclosing said bed and an open end; said fabric tailgate comprising:

(a) a plastic fabric having ends, a top and a bottom; and wherein said plastic fabric is plastic coated polyester yarn having a weave of at least twenty threads per inch, but not less than ten threads per inch, vertically and horizontally so that a logo could be printed thereon and can be read by a person viewing said logo;

(b) C-shaped anchoring means mounted on said open end to each of said sides and at the top of said sides;

(c) strap means attached to said plastic fabric along said top and adapted to extend through said anchoring means;

(d) strap securing means attached to said strap means and configured to receive said strap means and lock said strap

means to said fabric means and to said sides of said truck so that said fabric means is stretched across said open end;

(e) an elongate securing means of a C-shaped cross-section and a length substantially same as the width of the truck bed.

(f) mounting means attached to said elongate securing means for attaching said securing means to the open edge of said bed;

(g) cylindrical means secured along the bottom of said plastic fabric, the diameter of said cylindrical means and the thickness of said plastic fabric when combined being dimensioned to slide into said elongate anchoring means to lock said plastic fabric along the open edge of said bed;

whereby said plastic fabric is retained along the bottom by said said elongate securing means and at the top to the sides by said "C" shaped anchoring means and said straps.

4,930,835

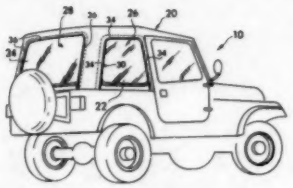
WEATHER SEAL FOR VEHICLE TOP PANELS

Douglas A. Bruce, and Richard C. Essig, both of Broomfield, Colo., assignors to Bestop, Inc., Broomfield, Colo.

Filed Jul. 25, 1989, Ser. No. 384,779

Int. Cl.[5] B62D *25/00*

U.S. Cl. 296—102 **36 Claims**



1. A top for a vehicle, said top having at least one opening formed in said top, said top comprising:

a panel and means for removably attaching at least a portion of said panel to said top in said opening; and,

means for substantially sealing said attaching means from outside elements, said sealing means including a member overlapping said attaching means when said panel is attached in said opening, said sealing means further including a substantially water-resistant seal and means for mounting said water-resistant seal to extend substantially between said overlapping member and one of said top and said panel to substantially prevent water and other outside elements from passing between said overlapping member and said one of said top and said panel to reach said attaching means.

4,930,836

DOOR ASSEMBLY FOR PICK-UP TRUCKS

Gary J. Grinn, Farmington Hills, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Jun. 24, 1988, Ser. No. 211,022

Int. Cl.[5] B60J *5/04*

U.S. Cl. 296—146 **1 Claim**

1. An improved door assembly for a vehicle body of the type in which two doors, each having front and rear edges, are longitudinally spaced as front and rear doors on at least one side of the vehicle body, the door assembly comprising:

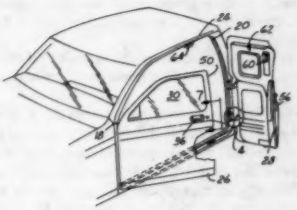
a continuous door aperture formed through the side of the body extending longitudinally between a front pillar having a vertical portion extending upwardly from the body floor and a rearwardly canted portion extending therefrom to the body roof and a rear pillar extending substantially vertically from the body floor to the body roof;

means for pivotally connecting the rear edge of the rear door to the rear pillar for swingable movement between a first position closing a portion of the continuous door aperture and an open position;

means for pivotally connecting the front edge of the front door to the vertical portion of the front pillar for swingable movement between a first position closing the remainder of the continuous door aperture and having rear edge portions overlying the front edge of the rear door and an open position;

a striker member carried on the front edge of the rear door;

a latch assembly carried at the rear edge of the front door for releasably engaging the striker member;



means for operating the latch assembly from an external surface of the vehicle body, the means for operating mounted only to the front door;

upper and lower latch means carried at the top and bottom of the rear door respectively;

upper and lower keeper means carried on the body roof and body floor for latchingly receiving the corresponding upper and lower latch means when the rear door is in the closed position; and

operating lever means, carried on the front edge of the rear door and inaccessible when the doors are both in their first positions, for moving the latch means with respect to the keeper means.

4,930,837

CAMPING CONVERSION

Colleen E. Marsh, Box 558A R.D. #4, Mountain Top, Pa. 18707, and Kenneth G. Baldwin, Jr., 45 LaGonda Ct., Danville, Calif. 94526

Filed Jun. 14, 1988, Ser. No. 206,521

Int. Cl.[5] B60R *27/00*

U.S. Cl. 296—165 **9 Claims**

1. A camping conversion for motor vehicles of the kind having a substantially open interior compartment defined in part by fixed sidewalls, a floor and a roof, the conversion comprising:

a pair of spaced tracks affixed to the vehicle beneath the vehicle floor and running transversely between the sidewalls;

a floor panel for an auxiliary compartment;

means for supporting the floor panel by the tracks and enabling movement of the floor panel between a retracted

position beneath the vehicle floor and an extended position level with and adjacent one side of the vehicle floor;

the auxiliary compartment having a wall module mounted for movement between retracted and extended positions, the module forming three walls of the auxiliary compartment including spaced apart lateral walls and a longitudinal wall, said lateral walls and said longitudinal wall of the wall module protruding from the vehicle interior in the extended position, and said lateral walls of the pop-out compartment being movable into the interior compartment such that the wall module forms part of one longitudinal side wall of the vehicle in the retracted position, the lateral walls of the wall module each comprising wall sections which slide over and overlap one another when the wall module is retracted, thereby forming a lateral partition of the interior compartment when the module is retracted;

retractable means carried by the vehicle and extendable to a position over the wall module to form a roof extension; and,

means for closing open seams between the wall module, the floor panel, the vehicle and the roof extension as necessary to substantially weatherproof the auxiliary compartment, whereby the size of the interior compartment may be significantly increased with minimal loss of usable space therein when all constituent parts of the auxiliary compartment are retracted.

4,930,838

PORTABLE STADIUM SEAT WITH EXTENSIBLE AND RETRACTABLE RAIN COVER

Omer E. Brabant, 2929 NE. 49th St., Fort Lauderdale, Fla. 33308

Filed Jun. 3, 1989, Ser. No. 374,773
Int. Cl.[5] A47C 7/66
U.S. Cl. 297—184 **8 Claims**

1. A portable stadium seat comprising:

a seat member;

a pair of bottom frame members attached to said seat member and extending up behind said seat member at laterally spaced locations;

a back structure having a frame with opposite legs having respective connections to said bottom frame members behind said seat member, a back rest attached to and extending across the front of said legs above said connections, and a rear member attached to and extending across the back of said legs, said rear member being spaced behind said back rest;

a roller rotatably mounted on said opposite legs of said frame of the back structure below said back rest and said rear member;

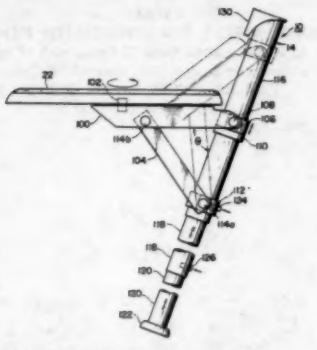
and a flexible folded rain cover wound on said roller and extending up from said roller between said back rest and said rear member of said back structure, said rain cover having a lower end attached to said roller and a free upper end, said rain cover having a retracted position in which its upper end is behind said back rest, said rain cover being adapted to be pulled up from said retracted position and unwound from said roller to an extended position in which its upper end is a substantial distance above said back rest to cover a person sitting on said seat member.

4,930,839

SINGLE-LEGGED CHAIR

Osamu Saito; Kazuko Iwano, and Yasushi Ikeda, all of Tokyo, Japan, assignors to Soft Energy Co., Ltd., Japan

Filed Jul. 22, 1988, Ser. No. 222,800
Int. Cl.[5] A47C 1/02
U.S. Cl. 297—338 **5 Claims**



1. A foldable single-legged chair comprising:

(a) a support post composed of upper, intermediate and lower tubular members different in diameter and telescopically connected one to another, said upper tubular member carrying on its lower end portion a first spring-biased pin normally projecting radially into said intermediate tubular member to prevent said intermediate tubular member from being retracted into and drawn from said upper tubular member, said first spring-biased pin being depressable to allow said intermediate tubular member to be retracted into and drawn from said upper tubular member, said intermediate tubular member carrying on its lower end portion a second spring-biased pin normally projecting radially into said lower tubular member to prevent said lower tubular member from being retracted into and drawn from said intermediate tubular member, said second spring-biased pin being depressable to allow said lower tubular member to be retracted into and drawn from said intermediate tubular member; and

(b) a seat including a lower sleeve fixedly mounted on said upper tubular member, an upper sleeve slidably mounted on said upper tubular member and movable toward and away from said upper sleeve, a saddle arm pivotally connected at one end to said upper sleeve, a stop ring mounted on said upper tubular member at a predetermined position between said upper and lower sleeves for retracting downward movement of said upper sleeve, a link pivotally connected at one end thereof to said saddle arm at a predetermined position remote from said upper sleeve and pivotally connected at the other end thereof to said lower sleeve, and a saddle pivotally mounted on said saddle arm, said upper sleeve being movable between an upper position in which said upper sleeve is disposed away from said stop ring in such a manner that said saddle lies in closely spaced parallel relation to said upper tubular member and a lower position in which said upper sleeve is disposed against said stop ring in such a manner that said

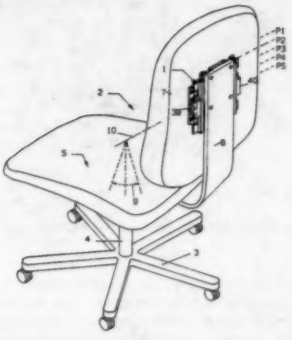
saddle lies at a predetermined angle of 70° to 85° with respect to said support post.

4,930,840

HINGED HEIGHT ADJUSTING DEVICE

Lino E. Tornero, 809 Quailmeadow La., Colfax, N.C. 27235

Filed Jul. 3, 1989, Ser. No. 375,054
Int. Cl.[5] A47C *7/40*
U.S. Cl. 297—353 10 Claims



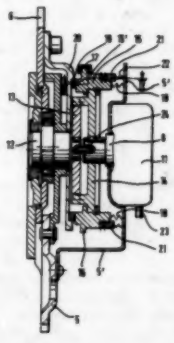
1. In a height adjusting device for two structures including a track plate attached to a first structure, said track plate provided with means for slidably receiving a slide plate attached to a second structure, and a lock pin for locking said slide plate relative to said track plate in any of a plurality of releasable positions, the improvement comprising: said track plate having means for attaching a hinge thereto, said hinge attaching means comprising a slot defined by said track plate along its outer edge, a hinge, said hinge defining a groove, said hinge constructed for cooperative engagement with said track plate slot as said hinge groove engages said track plate.

4,930,841

BACK-REST ADJUSTER WITH A FREE PIVOT DEVICE

Werner Wittig, Winnweiler, Fed. Rep. of Germany, assignor to Keiper Recaro GmbH & Co., Fed. Rep. of Germany

Filed May 17, 1989, Ser. No. 352,891
Claims priority, application Fed. Rep. of Germany, May 18, 1988, 3816833
Int. Cl.[5] B60N *1/04*
U.S. Cl. 297—379 10 Claims



1. A back rest adjuster with a free pivot device for a motor vehicle and comprising a lower fitting part to be connected to the seat frame and an upper fitting part to be connected to the back-rest, the two fitting parts being connected pivotally to each other by a hinge pin defining the pivot axis of the back-rest, and comprising a self-locking gearing, the input of which is to be coupled to a drive device while its output shaft can be connected to the upper fitting part via a torque transmitting means, characterized in that

(a) the torque transmitting means comprises a shiftable clutch which has to be disengaged to allow free pivoting and which comprises a first clutch part coupled to the output shaft of the gearing and a second clutch part mounted on the hinge pin, said two clutch parts adapted for movement in an axial direction in relation to each other;

(b) the first clutch part, which has to be moved from a shift in the direction of its axis of rotation, is associated with a memory ring adapated for movement together with and disposed concentrically of said first clutch part, the said memory ring being disposed between a drive ring which is non-rotatable in relation to the upper fitting part and a ratchet ring which is non-rotatable in relation to the lower fitting part whereby during pivoting of the upper clutch part the memory ring rotates together with the upper fitting part when the clutch is engaged, and remains stationary when the clutch is disengaged;

(c) the memory and the drive ring which, when the clutch is disengaged, are to a limited degree rotatable in relation to each other, are form-lockingly coupled to each other only in one single position at the end of the range of rotation when the clutch is engaged, whereby when the back-rest is folded back, the upper fitting part is stopped in the same position in which it is started for folding; and

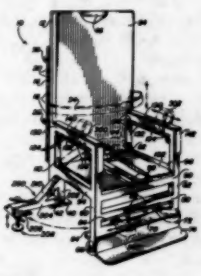
(d) when the clutch is disengaged, the memory ring can in any rotary position be coupled in form-locking fashion to the ratchet ring which is non-rotatable in relation to the lower fitting part.

4,930,842

RESTRAINT CHAIR APPARATUS

Kerry E. Wilkinson, and Larry A. DuVall, both of Phoenix, Ariz., assignors to Parkway Manufacturing, Inc., Phoenix, Ariz.

Filed Jul. 24, 1989, Ser. No. 383,999
Int. Cl.[5] A47C *31/00*
U.S. Cl. 297—466 23 Claims



1. Restraint chair apparatus comprising, in combination:
frame means for supporting a person being restrained, including
seat means on which the person being restrained sits,
leg means, including rear leg means and front leg means, for supporting the seat means,
back means extending upwardly from the rear leg means and against which the person being restrained is disposed, and
arm rest means secured to the back means and front leg

means for supporting the arms of the person being restrained;

outrigger means secured to the frame means for providing lateral support for the frame means; and

restraint means for securing the person being restrained to the frame means, including chest restraint means, lap restraint means, arm restraint means, and leg restraint means.

4,930,843

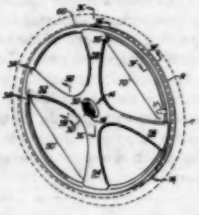
HOLLOW SHELL FIBER REINFORCED RESIN IMPREGNATED BICYCLE WHEEL CONSTRUCTION AND METHOD THEREFOR

Ralph H. Lewis, Antioch, Calif., assignor to Hamilton-Sattui, Napa, Calif.

Filed Oct. 14, 1988, Ser. No. 258,227

Int. Cl.[5] B60B 1/06

U.S. Cl. 301—63 PW **14 Claims**



1. An improved bicycle wheel including a hub for defining a bicycle wheel axis, a plurality of radially extending spokes extending from said hub outwardly to a surrounding rim supported at the distal ends of said spokes from said hub, said rim defining a concavity for receiving a bicycle tire, the improvements comprising:

a bicycle wheel bearing housing;

a central hub around said bicycle wheel bearing housing, said central hub having a hollow resin fiber reinforced construction around said bicycle wheel bearing housing, said hollow resin fiber reinforced construction defining a vacant interior to said hub with a fiber reinforced resin shell on the exterior;

a plurality of no more than five radially extending spokes having hollow resin fiber reinforced construction, each said spoke commencing at said hub and extending radially outward from said hub to the rim of said bicycle wheel;

paired adjacent spokes defining through the central hub of said wheel a spoke arch with one spoke of said spoke pair forming one end of said spoke arch, the other spoke of said spoke pair forming the opposite end of said spoke arch, and said hub forming the medial section of said spoke arch therebetween;

a rim having resin fiber reinforced construction extending peripherally around the wheel, said rim as extending between the ends of paired adjacent spokes forming a rim arch with said rim arch at one spoke of the spoke pair forming a first rim arch end, the rim arch at the other spoke end of each spoke pair forming a second rim arch end and the section of the rim between the spokes defining the central portion of said rim arch; and

the central portion of said rim arch reinforced by fiber reinforced construction for receiving maximum forces of rim arch compression and tension between said spoke pair.

4,930,844

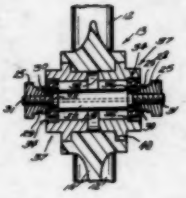
WHEEL

Edward J. Giroux, P.O. Box 247, Milford, Mich. 48042

Filed Oct. 17, 1988, Ser. No. 258,491

Int. Cl.[5] B60B 27/02

U.S. Cl. 301—63 PW **4 Claims**



1. An injection molded wheel of the bicycle type comprising:

a rim portion;

a metal rim liner perimetrically secured to said rim portion;

a hub portion integral with said rim portion and said rim and hub portions radially connected by vane-like spokes each of said spokes having a tear drop cross sectional configuration and said rim portion, said hub portion, and said vane-like spokes being integral in a cured polyamide with uniformly dispersed fiber filler;

a pair of bearing supports press fitted into said hub portion on the axis thereof, one at one side of said hub portion and the other at the opposite side of said hub portion and said bearing supports fixed against turning on said axis; a pair of cartridge type sealed anti-friction bearings, one peripherally secured in each of said supports;

a tubular axle having cylindrical journal extensions partially in support of said bearings and having threaded end portions; and

a pair of threaded nuts over said threaded end portions of said axle and said nuts including a cylindrical projection in partial inner support of said bearing served by said nuts and in axial register with said cylindrical journal extension on said tubular axle.

4,930,845

PROCESS AND CIRCUIT CONFIGURATION FOR CONTROLLING A BRAKE SYSTEM WITH SEQUENTIAL BRAKE PRESSURE MODULATION

Hans W. Bleckmann, Obermoerlen; Helmut Fennel, Bad Soden; Johannes Graeber, Eschborn; Otto Determann, Darmstadt, and Ivica Batistic, Frankfurt/Main, all of Fed. Rep. of Germany, assignors to Alfred Teves GmbH, Frankfurt, Fed. Rep. of Germany

Filed Mar. 15, 1989, Ser. No. 323,921

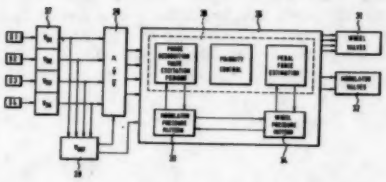
Claims priority, application Fed. Rep. of Germany, Mar. 18, 1988, 3809099

Int. Cl.[5] B60T 8/58, 8/60

U.S. Cl. 303—100 **6 Claims**

1. A process for controlling a brake system with slip control wherein, in the event of control, brake pressure is sequentially modulated in the individual control channels, using a master cylinder connected to which are wheel brakes, through multi-way valves wheel open in the basic position and reswitchable to the blocking position, and a modulator coupled ahead of the master cylinder and generating, through auxiliary pressure controlled by multi-way modulator valves, a force component counter-acting the pedal force, said process comprising the steps of: determining rotating patterns of the wheels by wheel sensors with electrical signals being generated for controlling the multi-way wheel valves, forming a modulator pressure pattern representing by approximation the course of pressure

in the modulator as a function of predetermined variables determining the pressure prevailing in at least one control chamber of the modulator, and determining the periods of excitation of at least one of the multi-way wheel valves and the multi-way modulator valves for the brake pressure control as a



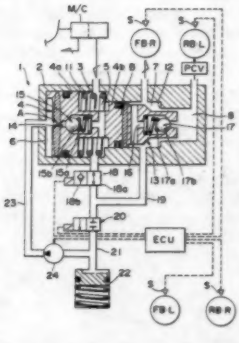
function of said signals, wherein in the step of forming the modulator pressure pattern, the periods of excitation of said multi-way modulator valves, in the actuation of the modulator, are measured and integrated under incorporation of the pressure increase and pressure decrease characteristics of the system.

4,930,846

ANTI-LOCK CONTROL APPARATUS

Katsuya Miyake, Ageo, and Yoshiaki Hirobe, Shiraoka, both of Japan, assignors to Akebono Brake Industry Co.

Filed Mar. 8, 1989, Ser. No. 320,575
Claims priority, application Japan, Mar. 30, 1988, 63-77905
Int. Cl.[5] B60T *8/62*
U.S. Cl. 303—111 **11 Claims**



1. An anti-lock control apparatus comprising:
- a modulator disposed at a point between a master cylinder and each set of front and rear brakes;
- a stepped piston accommodated in the cylinder of said modulator, said stepped piston having a large diameter portion and a small diameter portion which projects from said large diameter portion in the direction parallel to the axis of said large diameter portion;
- an input fluid chamber defined between said large diameter portion and said small diameter portion o said stepped piston in said cylinder, said input fluid chamber being formed to receive fluid pressure from said master cylinder;
- a backpressure fluid chamber defined on the side of said large diameter portion which is opposite to said small diameter portion;
- a front output fluid chamber defined at a first location o the side of said small diameter portion which is opposite to said large diameter portion, said front output fluid chamber being connected to said front brake;
- a rear output fluid chamber defined at a second location on the side of said small diameter portion which is opposite to said large diameter portion, said rear output fluid chamber being connected to said rear brake, said front output fluid chamber and said rear output fluid chamber communicating with each other when said stepped piston is displaced in said backpressure fluid chamber;
- a cut-off valve portion formed on a front portion of said small diameter portion of said stepped piston;
- a cut-off valve seat formed on said cylinder in opposed relationship to said cut-off valve portion, the communication between said front output fluid chamber and said rear output fluid chamber being cut off when said stepped piston is displaced in the direction away from said backpressure fluid chamber to bring said cut-off valve portion into contact with said cut-off valve seat
- a communication channel extending through said large diameter portion to provide communication between said backpressure fluid chamber and said input fluid chamber;
- a check valve disposed at an intermediate location in said communication channel with the forward direction of said check valve corresponding to the direction of a fluid flow from said backpressure fluid chamber to said input fluid chamber;
- a first fluid channel including a normally open hold valve, said input fluid chamber and said front output fluid chamber being connected by said first fluid channel through said normally open hold valve;
- a second fluid channel including a normally closed decay valve, said front output fluid chamber being connected to a reservoir by said second fluid channel through said normally closed decay valve; and
- a third fluid channel including a pump, said reservoir being connected to said backpressure fluid chamber by said third fluid channel through said pump so that brake fluid may be pumped from said reservoir into said backpressure fluid chamber through said third fluid channel,

whereby when a tendency to wheel-lock appears, said hold valve is closed, while said decay valve is opened.

4,930,847

MULTICOLOR HOLOGRAPHIC ELEMENT AND APPARATUS FOR HEAD-UP DISPLAY APPLICATIONS

John N. Cederquist, Ann Arbor, Mich., assignor to Environmental Research Institute of Michigan, Ann Arbor, Mich.

Continuation of Ser. No. 71,620, Jul. 9, 1987, abandoned, which is a continuation of Ser. No. 661,932, Oct. 17, 1984, abandoned.
This application Dec. 12, 1988, Ser. No. 284,756
Int. Cl.[5] G03H *1/04*; G02B *5/32*
U.S. Cl. 350—3.6 **4 Claims**

1. A method for employing light of a second wavelength, λ' for producing a holographic optical element from a design for a holographic optical element adapted to be produced at a first wavelength λ by a process wherein a reference beam of coherent light at said first wavelength and an object beam of coherent light at said first wavelength are impinged upon a photographic medium from a first set of directions so as to establish a first recording geometry defining a first phase function, $\phi H^{(x,y)}$ said method including:

providing second coherent reference and object beams at said second wavelength λ';

altering the direction at which said second reference and object means impinge upon said medium so as to establish means impinge upon said medium so as to establish a second recording geometry, said second geometry selected so as to provide a second phase function $\phi' H^{(x,y)}$ which is equal to the first phase function $\phi H^{(x,y)}$ times the ratio of said first wavelength to said second wavelength; and

exposing said photographic medium to said second beams.

4,930,848

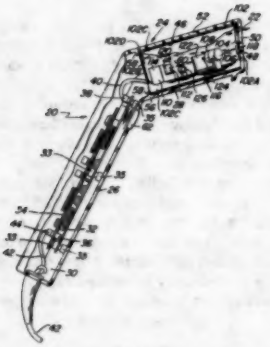
PORTABLE LASER SCANNER WITH INTEGRAL SCANNER ENGINE

Carl H. Knowles, Moorestown, N.J., assignor to Metrologic Instruments, Inc., Bellmawr, N.J.

Filed Jan. 26, 1989, Ser. No. 303,376

Int. Cl.[5] G02B 26/10; G06K 7/10

U.S. Cl. 350—6.6 **20 Claims**



1. A hand-held laser scanner comprising a housing having a hand grip portion and a body portion projecting at an angle to said hand grip portion and having a forward free end, said body portion including a chamber in which an integral scanning module is located, said module being releasable securable in said chamber and comprising an enclosure having a window, which when the module is disposed within said chamber is located at said free end of said body portion, said module also comprising beam sweeping means for sweeping a laser beam from a predetermined point within said enclosure through a predetermined angle to produce a scan pattern comprising at least one line, and beam folding means projecting the scan pattern out of said window, said beam folding means being located between said beam sweeping means and said window for folding the path of the swept beam within said housing, said module also comprising output conductor means for carrying a signal indicative of the symbol scanned to circuit means located within said hand-grip portion of said scanner.

4,930,849

LASER SCANNING APPARATUS AND METHOD OF SCANNING USING SAME

Satoru Tanaka, Saitama, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Apr. 12, 1989, Ser. No. 336,481

Claims priority, application Japan, Oct. 27, 1988, 63-271539

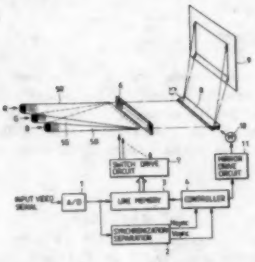
Int. Cl.[5] G02B 26/10, 6/04

U.S. Cl. 350—6.6 **10 Claims**

1. A laser scanning apparatus, comprising:

a plurality of optical fiber bundle elements, each corresponding to a respective one of three primary colors and having an emitting end, each emitting end disposed adjacent to the other and aligned on at least one line in a horizontal scanning direction at a first pitch with respect to the other, each emitting end emitting a light beam of the respective color;

an array of spaced light switches disposed adjacent to the emitting ends of the optical fiber bundle elements, each light switch disposed adjacent to the other and aligned in the longitudinal direction of the array at a second pitch, the second pitch being equal to the first pitch, each light switch being independently opened or closed;



means for opening or closing each light switch in response to information corresponding to a horizontal scanning period of an input video signal corresponding to a video image; and

means for polarizing the light beams passing through the array of light switches at each horizontal scanning period and scanning the polarized light beams in a vertical scanning direction for projecting the video image on a screen, the vertical scanning direction being substantially perpendicular to the horizontal scanning direction.

4,930,850

SCANNING OPTICAL SYSTEM FOR USE IN LASER BEAM PRINTER

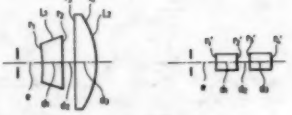
Akira Morimoto, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 7, 1988, Ser. No. 267,892

Claims priority, application Japan, Nov. 6, 1987, 62-280809

Int. Cl.[5] G02B 26/10

U.S. Cl. 350—6.8 **11 Claims**



1. A scanning optical system for use in a laser printer comprising:

a semiconductor laser;

a collimator lens receiving laser light from said semiconductor laser and emitting substantially parallel light rays;

a cylindrical lens having a curvature in a cross section taken in a first direction normal to a main scan direction, said cylindrical lens receiving said parallel light rays emitted by said collimator lens and images said laser light at a focusing point in said cross section taken in said first direction;

a deflector which deflects light rays transmitted by said cylindrical lens, said deflector being disposed on an opposite side of said focusing point in said cross section taken in said first direction; and

an anamorphic scanning lens unit which converges light rays deflected by said deflector at a point on a scanning surface;

wherein said anamorphic scanning lens unit has a two-element composition comprising, in order from a side nearest said deflector;

a first lens having a negative lens element with a concave spherical surface on a side facing said deflector and a concave cylindrical surface on a side facing said scanning surface, said concave cylindrical surface having a curvature in said cross section taken in said first direction, and

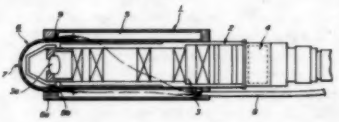
a second lens having a planar surface on a side facing said deflector and a convex toric surface on a side facing said scanning surface, said convex toric surface having a stronger curvature in said cross section taken in said first direction.

4,930,851

IMAGE MAGNIFYING AND PICK-UP SYSTEM WITH LIGHTING LIGHT-GUIDE DEVICE

Masao Yamamoto, Tokyo, Japan, assignor to Mitsubishi Kasei Corporation, Tokyo and Scalar Corporation, Tama, both of, Japan

Filed Jun. 7, 1989, Ser. No. 362,658
Claims priority, application Japan, Jun. 7, 1988, 63-139905
Int. Cl.[5] G02B *6/14*
U.S. Cl. 350—96.10 **8 Claims**



1. An image magnifying and picking-up system incorporating a lighting light-guide device system comprising:

a lens tube;

a magnifying optical system located within said lens tube;

an image pick-up element at the proximal or rear end of said lens tube for converting an optical image obtained through said optical system into an electrical signal;

a light-guide cap mounted at the distal or front end of said lens tube, said light-guide cap being formed of a transparent material and having a substantially hemispherical shape, said light-guide cap comprising an observation aperture at the central portion thereof; and

an illuminating system for introducing illumination light into said light guide cap from the annular end surface of said light-guide cap thereof;

whereby a subject at the observation aperture is illuminated by both light guided within said lightguide cap and light having leaked from said light-guide cap.

4,930,852

OPTICAL FIBER MOUNTING AND STRUCTURAL MONITORING

Richard G. Wheeler, Robbinsville, N.J., and Roy Robinson, Hook Bathingstoke, England, assignors to Simmonds Precision Product, Inc., Wilmington, Del.

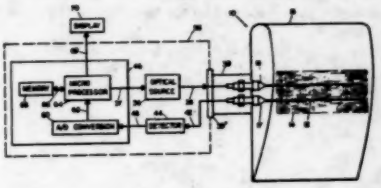
Filed Feb. 21, 1989, Ser. No. 313,262
Int. Cl.[5] G02B *6/00*; G01L *1/24*
U.S. Cl. 350—96.10 **21 Claims**

1. An optical fiber mounting device, consisting essentially of:

an optical fiber and

a support sheet of fabric,

said optical fiber being connected to said sheet of fabric,



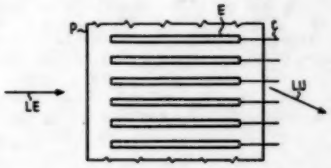
said sheet having a release coating on at least one side of said fabric.

4,930,853

ELECTROOPTIC DEFLECTOR

Giorgio Grego, Venaria, Italy, assignor to Cselt - Centro Studi E Laboratori Telecomunicazioni S.P.A., Turin, Italy

Filed Jul. 24, 1989, Ser. No. 384,642
Int. Cl.[5] G02B *6/10*; G02F *1/01*
U.S. Cl. 350—96.14 **2 Claims**



1. An electrooptic deflector for deflection of a light beam over angles of tens of degrees, said electrooptic deflector comprising:

an elongated plate composed of a material whose refractive index can be varied by application of an electric field thereto, said plate being formed with a first planar surface along one longitudinal side of said plate, a second planar surface along an opposite longitudinal side of said plate and a third planar surface between said first and second planar surfaces;

a multiplicity of electrode strips deposited on said third planar surface and extending in mutually parallel transversely spaced relationship transverse to a longitudinal dimension of said plate in an array of sufficient length to effect said deflection of said light beam over angles of tens of degrees;

voltage-source means connected to said electrode strips for applying voltages to said strips progressively increasing from one strip to a next strip selectively in a respective direction over the entire array, thereby forming in said material a multiplicity of parallel zones with refractive indices proportionally increasing in said direction over said array; and

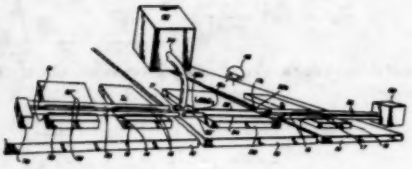
means for introducing a collimated optical beam into said plate through said first surface in a direction parallel to said electrode strips, whereby said collimated optical beam is deflected in said direction and emerges as an outgoing optical beam from said second surface.

4,930,854

OPTICAL FIBER-TO-CHANNEL WAVEGUIDE COUPLER

Donald J. Albares; David B. Cavanaugh, and Thomas W. Trask, all of San Diego, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 3, 1989, Ser. No. 318,989
Int. Cl.[5] G02B 6/30
U.S. Cl. 350—96.17 **12 Claims**



1. A method of end-on optically coupling an optical fiber to an optical waveguide on a waveguide chip mounted on a base comprising:

mounting a semiconductor chip provided with a V-shaped groove on said base in a spaced-apart relationship with said waveguide chip;

applying a UV curable optical cement in said V-shaped groove and on an end of said optical fiber after the step of mounting;

placing said optical fiber in said V-shaped groove to locate an overhanging section including said end adjacent said optical waveguide after the step of applying;

positioning said end of said optical fiber to a position of desired optical alignment with said optical waveguide after the step of placing; and

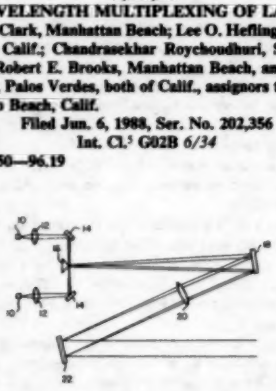
radiating UV energy on said UV curable optical cement to cure it and to secure said optical fiber in said V-shaped groove and said end of said optical fiber in said position of said desired optical alignment after the step of positioning.

4,930,855

WAVELENGTH MULTIPLEXING OF LASERS

George L. Clark, Manhattan Beach; Lee O. Heflinger, Torrance, both of Calif.; Chandrasekhar Roychoudhuri, Sandy Hook, Conn.; Robert E. Brooks, Manhattan Beach, and Madan M. Sharma, Palos Verdes, both of Calif., assignors to TRW Inc., Redondo Beach, Calif.

Filed Jun. 6, 1988, Ser. No. 202,356
Int. Cl.[5] G02B 6/34
U.S. Cl. 350—96.19 **16 Claims**



1. In an optical-wavelength communication system, apparatus comprising:

a plurality of diode lasers operating at different wavelengths; and

means for combining substantially the entire outputs of the lasers in such a manner as to produce a substantially colinear and nearly diffraction-limited output beam having an average power approximating the sum of the outputs of the separate lasers;

wherein the means for combining includes

dispersion means, and

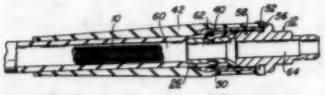
means for collimating and directing the outputs of the lasers onto the dispersion means at appropriate angles of incidence to produce colinear dispersed beams.

4,930,856

TERMINATION FOR FLEXIBLE LIGHT-TRANSMITTING CABLES

Samuel Pelta, Philadelphia, Pa., assignor to Pilling Co., Fort Washington, Pa.

Filed Feb. 14, 1986, Ser. No. 829,617
Int. Cl.[5] G02B 6/36
U.S. Cl. 350—96.2 **9 Claims**



1. In a flexible light-transmitting cable assembly comprising a bundle of light-conducting fibers extending through a flexible, tubular elastomeric sheath having a predetermined relaxed internal diameter, a cable termination comprising:

a tubular insert located at one end of the sheath between the bundle of light-conducting fibers and the inner wall of the sheath, said insert having a central passage through which said bundle extends, an external wall at least part of which is larger in diameter than the relaxed internal diameter of the sheath, said external wall stretching said one end of the sheath outwardly beyond its relaxed internal diameter, and an annular groove in said external wall;

a ring surrounding said sheath at the axial location of said annular groove;

a compression fitting surrounding said sheath at said one end thereof and also surrounding said ring, said compression fitting having an inner wall comprising a cylindrical section extending over the sheath and beyond said one end thereof, and said inner wall also comprising a tapered section located over the sheath, the larger diameter end of the tapered section being nearer said one end of the sheath than is the smaller diameter end thereof, said tapered section being in contact with said ring, and said tapered section exerting an inwardly-directed compressive force on said ring, and said ring, in response, exerting an inwardly-directed compressive force on said sheath, urging the sheath tightly into said groove; and

an end fitting having a cylindrical outer wall at one end thereof, said outer wall having a portion located inside, and substantially conforming to, a portion of said cylindrical section of the inner wall of the compression fitting, said end fitting and said insert being separate elements, and said end fitting also having a connector at the opposite end thereof, and a semi-rigid extension fixed to the compression fitting, said extension having an annular inwardly projecting ridge, and said end fitting having a groove receiving said ridge.

4,930,857

HYBRID PACKAGE ARRANGEMENT

Muvaffak S. Acarlar, Allentown, Pa., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

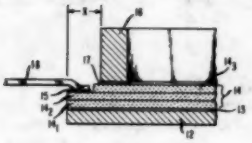
Filed May 19, 1989, Ser. No. 353,922
Int. Cl.[5] G02B 6/42
U.S. Cl. 350—96.20 **12 Claims**

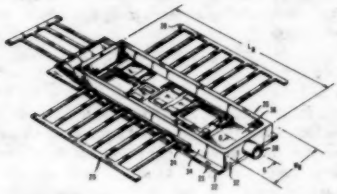
1. A package for providing interconnection between at least one internal component disposed within said package, as well as interconnection between said at least one internal component and at least one external component, a plurality of leads

being used to provide the interconnection between the internal and external components, said package comprising

a base plate having at least a conductive top surface;

a multi-layer ceramic (MLC) member disposed over said base plate and including sites for placement of said at least one internal component, said MLC member including metallized sections for providing interconnection between said internal components and a plurality of bondpad sites located along the periphery thereof, said plurality of





bondpad sites utilized to provide interconnection between said internal and external components; and

a ring sidewall comprising at least a conductive outer coating, said ring being disposed over said MLC member and said base plate in a manner such that the periphery of said ring defines the internal portion of said package, said ring formed so as to expose at least the portions of said MLC member which contain bondpad sites without exposing any internal component-containing sites.

4,930,858

FIBER OPTIC MOUNTING AND ALIGNMENT APPARATUS

Cornelis T. Veenendaal, Cornelius, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Continuation of Ser. No. 192,314, May 9, 1988, abandoned. This application Apr. 10, 1989, Ser. No. 334,789

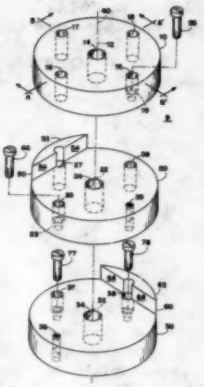
Int. Cl.[5] G02B *6/36, 7/26*

U.S. Cl. 350—96.20 **17 Claims**

1. A mounting and aligning apparatus for a fiber optic cable comprising:

top, middle and bottom segments, each said segment having a periphery, opposed parallel surfaces and an aperture positioned on a central axis orthogonal to said surfaces, said central axes of said segments forming a central axis for said apparatus;

means for interconnecting said top, middle and bottom segments, said interconnecting means forming a first angle between said bottom and middle segments and a second angle between said middle and top segments, said interconnecting means between said bottom and middle segments being rotated with respect to said interconnecting means between said middle and top segments about said central axis of said apparatus to form a third angle; and



means for independently adjusting said segments relative to each other.

4,930,859

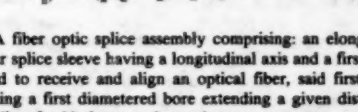
FIBER OPTIC SPLICE ASSEMBLY

Arthur J. Hoffman, III, R.D. 2, Box 502, Montgomery, Pa. 17752

Continuation of Ser. No. 916,666, Oct. 8, 1986, abandoned. This application Sep. 7, 1989, Ser. No. 403,014

Int. Cl.[5] G02B *6/38*

U.S. Cl. 350—96.21 **2 Claims**



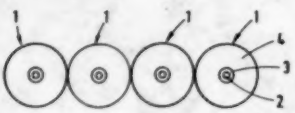
1. A fiber optic splice assembly comprising: an elongated tubular splice sleeve having a longitudinal axis and a first end formed to receive and align an optical fiber, said first end including a first diametered bore extending a given distance inwardly of said sleeve and tapering to a narrower, second diametered bore, said first diametered bore being of a size to receive a coated fiber and said second diametered bore being of a size to receive a stripped fiber; a middle portion and a contiguous second end, each having a third diametered bore, larger than said first diametered bore, said middle portion containing a mated pair of elastomeric halves therein; said second end containing a fiber guide comprised of a cylindrical member having an outside diameter equal to the diameter of said third diametered bore, said fiber guide including a fourth diametered bore extending a given distance inwardly of said guide and tapering to a narrower, fifth diametered bore, said fourth diameter being equal to said first diameter and said fifth diameter being equal to said second diameter.

4,930,860

PROPELLABLE OPTICAL FIBER CABLES

John A. Tansey, Runcorn; Rodney J. Davey, Prescott, and Alan A. Sadler, Warrington, all of England, assignors to BICC plc, London and Corning Limited, Sunderlan, both of, England

Filed Jun. 16, 1988, Ser. No. 207,661
Claims priority, application United Kingdom, Jun. 17, 1987, 8714226
Int. Cl.[5] G02B 6/44
U.S. Cl. 350—96.23 11 Claims



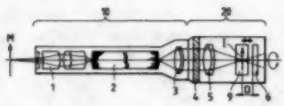
1. An optical fiber cable comprising a plurality of optical fiber structures each of which comprises an optical fiber surrounded by at least one sheath layer, the said optical fiber structures being separably held together side-by-side, the optical fiber cable being sufficiently lightweight and flexible to be propellable along a tubular pathway by fluid drag of a gaseous medium passing over the cable.

4,930,861

TELEVISION CAMERA FOR ENDOSCOPES

Misoru Okabe, Kanagawa, and Akira Kikuchi, Tokyo, both of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Nov. 10, 1988, Ser. No. 269,610
Claims priority, application Japan, Nov. 12, 1987, 62-286293; Dec. 9, 1987, 62-309683
Int. Cl.[5] G02B 23/26
U.S. Cl. 350—96.25 13 Claims



1. A television camera for endoscopes for photographing an image of an object formed on an exit end face of an image guide fiber bundle included in said endoscopes, comprising:

an image sensor,

an imaging lens system for focusing the image of said object onto a light receiving surface of said image sensor, said imaging lens system having some aberration to impart a degree of blurring, and

an optical low pass filter between said exit end face of said image guide and said image sensor;

said television camera being arranged so that the relative position of the image formed by said imaging lens system and said light receiving surface is adjustable along the optical axis of said imaging lens system so as to satisfy the following condition (1):

$$D_0 \geq 0.6/\nu \quad (1)$$

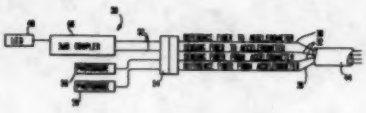
wherein reference symbol D_0 represents a diameter of a circle of confusion on said light receiving surface, and reference symbol ν represents a spatial frequency determined by a diameter of unit fiber of said image guide fiber bundle or the spatial frequency corresponding to the Nyquist frequency of said image sensor.

4,930,862

FIBEROPTIC MICROBEND ACCELEROMETER

David R. Miers, Hamburg, N.J.; David Raj, Alliance, Ohio, and Deepak Varshneya, Delmar, Calif., assignors to The Babcock & Wilcox Company, New Orleans, La.

Division of Ser. No. 146,052, Jan. 20, 1988, Pat. No. 4,860,586.
This application Apr. 19, 1989, Ser. No. 340,186
Int. Cl.[5] G02B 6/42
U.S. Cl. 350—96.29 5 Claims



1. An apparatus for conditioning the output signal of an optical fiber sensor having a first optical sensing fiber and a second optical reference fiber with both fibers being connected to a light source for supplying light of equal intensity therethrough, comprising:

a first light sensing means connected to said optical sensing fiber for measuring changes in light intensity transmitted therethrough;

a second light sensing means connected to said optical reference fiber for measuring changes in light intensity transmitted therethrough;

means for determining a logarithm light intensity ratio connected to said first and second light sensing means which receives the measured light intensities therefrom; and

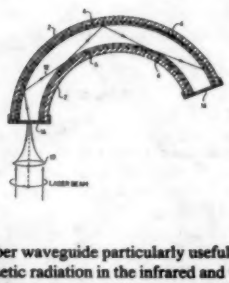
scaling means connected to said logarithm light intensity ratio determining means for scaling the logarithm of the light intensity ratio to provide a scaled measurement of the output signal.

4,930,863

HOLLOW FIBER WAVEGUIDE AND METHOD OF MAKING SAME

Natan Croitoru, Kfar-Saba; Jacob Dror, Tel Aviv; Ephraim Goldenberg, Tel Aviv; David Mendelovic, Tel Aviv, and Ganot Israel, Hedera, all of Israel, assignors to Rauiot University Authority for Applied Research and Industrial Development Ltd., Tel Aviv, Israel

Filed Apr. 24, 1989, Ser. No. 341,872
Claims priority, application Israel, May 6, 1988, 86296
Int. Cl.[5] G02B 6/20
U.S. Cl. 350—96.32 18 Claims



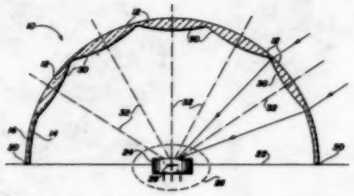
1. A hollow fiber waveguide particularly useful for transmitting electromagnetic radiation in the infrared and visible range, comprising: a hollow tube; a metal layer on the inner surface of the hollow tube; and a thin dielectric film of silver iodide over said metal layer.

4,930,864

DOMED SEGMENTED LENS SYSTEMS

Walter Kuster, Tugen, and Hans J. Keller, Staefe, both of Switzerland, assignors to Eltec Instruments, Inc., Daytona Beach, Fla.

Filed Aug. 2, 1988, Ser. No. 227,277
Int. Cl.[5] G02B *27/00*; G08B *13/18*
U.S. Cl. 350—167 19 Claims



19. A panoramic infrared detector comprising:

an infrared detector element;

a spherical section about the infared detector, the spherical section having an outer spherical surface and an inner surface, the outer spherical surface having a single radius of curvature about the infrared detector element;

a plurality of convex lens formed in the spherical section between the outer spherical surface and the inner surface; and wherein

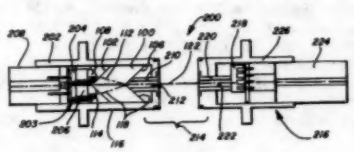
the optical axis of each lens intersects the detector element.

4,930,865

OPTICAL TRANSMISSION SPECTROMETER

Andres J. Doumann, Mishawaka, Ind., assignor to Miles Inc., Elkhart, Ind.

Filed Nov. 4, 1988, Ser. No. 267,309
Int. Cl.[5] G02B *27/12, 5/04*; G01J *3/28*
U.S. Cl. 350—169 7 Claims



1. An optical transmission spectrometer for absorbing and scattering sample readings, comprising:

a plurality of light sources for producing light, the absorption of which in a sample is to be measured by the spectrometer;

a holder for said plurality of light sources;

a light beam-combiner for combining beams of light from said light sources by refraction into a primary beam of light, said light beam combiner including first and second parallel refractive surfaces for refracting light from said light sources into said primary beam;

a first collimating device adjacent said light beam-combiner for baffling stray light passing from the said light beam-combiner and the light source;

a mounting assembly for mounting a sample in the optical transmission spectrometer adjacent said first collimating device; and

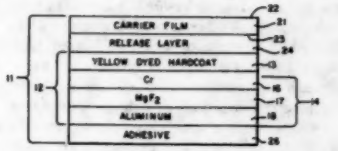
a detection assembly for detecting absorption of light passing through a sample in said mounting assembly.

4,930,866

THIN FILM OPTICAL VARIABLE ARTICLE AND METHOD HAVING GOLD TO GREEN COLOR SHIFT FOR CURRENCY AUTHENTICATION

Peter H. Berning, Sebastopol, and Roger W. Phillips, Santa Rosa, both of Calif., assignors to Flex Products, Inc., Santa Rosa, Calif.

Division of Ser. No. 88,144, Aug. 21, 1987, Pat. No. 4,779,898, which is a division of Ser. No. 935,065, Nov. 21, 1986, Pat. No. 4,705,300. This application Jun. 10, 1988, Ser. No. 204,723
Int. Cl.[5] G02B *27/00*; B42D *15/00*
U.S. Cl. 350—320 1 Claim



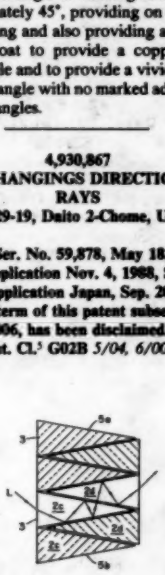
1. In a method for providing a color shift in a colored article from a coppery-gold to vivid green with a change in angle of incidence of light and angle of viewing of reflected light from normal to approximately 45°, providing on the article a multilayer thin film coating and also providing a subtractive colorant carrying hardcoat to provide a coppery-gold color at normal viewing angle and to provide a vivid green at approximately 45° viewing angle with no marked additional color shift at steeper viewing angles.

4,930,867

DEVICE FOR CHANGINGS DIRECTIONS OF LIGHT RAYS

Masataka Negishi, 29-19, Daito 2-Chome, Urawa-shi, Saitama-Ken, Japan

Continuation of Ser. No. 59,878, May 18, 1987, Pat. No. 4,813,765. This application Nov. 4, 1988, Ser. No. 267,188
Claims priority, application Japan, Sep. 20, 1985, 60-209725
The portion of the term of this patent subsequent to Mar. 21, 2006, has been disclaimed.
Int. Cl.[5] G02B *5/04, 6/00*
U.S. Cl. 350—286 4 Claims



1. An assembly for changing the directions of light rays, comprising a plurality of three-dimensionally shaped main bodies each of which is made of an optically transparent material and has a light incidence surface and a light emerging surface; each main body having reflecting surfaces for causing successive internal reflections therewithin of light rays which have entered thereinto through said light incidence surface; said reflecting surfaces having such profiles that when the light rays undergo the successive internal reflections by said reflecting surfaces, the directions of said successively internally reflected light rays are caused to have incident angles which at least reach a critical angle with respect to said reflecting surfaces; portions of said reflecting surfaces at which said successively internally reflected light rays reach angles equal to or smaller than said critical angle and surface portions adjacent to

said portions of said reflecting surfaces constituting said light emerging surface through which the light rays whose directions are changed are emitted; all the light incidence surfaces of said plurality of main bodies being arranged in a parallel array and in coplanar relationship with each other, wherein each main body is in the form of a wedge-shaped plate whose thickness is gradually decreased from one side thereof to an opposite, other side thereof; an end face at said one side of said wedge-shaped plate defining said light incidence surface; opposing surfaces extended between said one and other sides of said wedge-shaped plate defining said reflecting surfaces; a portion of said wedge-shaped plate adjacent to said other side of said wedge-shaped plate being said light-emerging surface portion; and the adjacent wedge-shaped plates being arranged in parallel with each other, and further comprising at least one member which is made of an optically transparent material disposed in a space defined between adjacent ones of said main bodies, each said member being another wedge-shaped plate for changing the directions of light rays emerging from said light emerging surface and being oriented in such a manner that the thickness of each said member is gradually decreased in a direction toward said light incidence surfaces.

4,930,868

COMBINER FOR OPTICAL OR ELECTRO-OPTICAL SYSTEMS

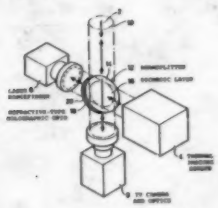
Jonathan Gerlitz, Herzelia, Israel, assignor to Sofin Ltd., Tel-Aviv, Israel

Continuation of Ser. No. 923,566, Oct. 27, 1986, abandoned. This application Oct. 11, 1988, Ser. No. 256,153

Claims priority, application Israel, Dec. 16, 1985, 77354

Int. Cl.[5] G02B *5/32, 27/10*

U.S. Cl. 350—3.7 **11 Claims**



1. A single-element beam splitter for splitting a beam of electromagnetic radiation passing therethrough, comprising:

a transparent window;

a dichroic coating on one face of said transparent window and effective to reflect part of the spectral range of the electromagnetic radiation and to transmit the remainder therethrough;

and a transmissive-type holographic grid bonded to the opposite face of said transparent window and effective to refract a narrow bandwidth of the electromagnetic radiation and to transmit the remaining electromagnetic radiation therethrough;

whereby said single-element beam splitter splits the beam of electromagnetic radiation into three components thereby enabling the optical apertures of three optical devices to be combined to one optical aperture with respect to said beam of electromagnetic radiation.

4,930,869

LIGHT BEAM SCANNING DEVICE

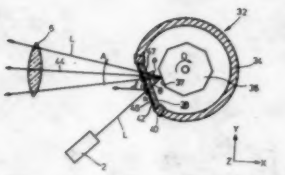
Ichiro Miyagawa, and Noboru Arai, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Aug. 8, 1988, Ser. No. 230,106

Claims priority, application Japan, Aug. 7, 1987, 62-198799

Int. Cl.[5] G02B *26/10*

U.S. Cl. 350—6.8 **11 Claims**



1. A light beam scanning device for scanning an object to read image information therefrom or record image information thereon, comprising:

a reflecting light deflector for deflecting a light beam in a plane;

a scanning lens for passing the light beam deflected by said light deflector toward the object; and

an optical element for directing the light beam from said light deflector therethrough toward said scanning lens, said optical element having an entrance surface for allowing the light beam to pass therethrough to said light deflector, said entrance surface being inclined at a first predetermined angle to a direction normal to an optical axis of said scanning lens, said first predetermined angle lying within said plane, whereby the changes in the optical element reflectance due to scanning of the beam are compensated by changes in the optical element transmittance.

4,930,870

RETRO-REFLECTORS

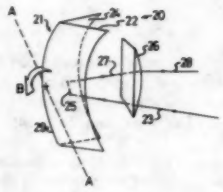
Allan D. Beach, and John S. Bruston, both of Auckland, New Zealand, assignors to ItW New Zealand Limited, Auckland, New Zealand

Filed Jul. 19, 1988, Ser. No. 221,465

Claims priority, application New Zealand, Jul. 27, 1987, 220831; Jul. 27, 1987, 221211; Jul. 27, 1987, 221212

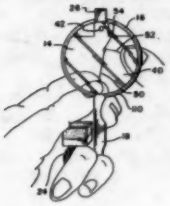
Int. Cl.[5] G02B *5/12*

U.S. Cl. 350—97 **20 Claims**



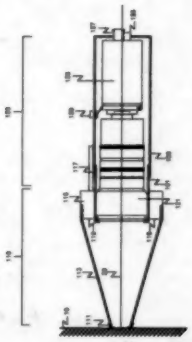
1. A retro-reflector system including a first reflective surface arranged to receive incident light from a source; a second reflective surface arranged to receive light reflected from said first reflective surface; and a lens arranged in crossed configuration with at least said second reflective surface, so that, in use, said incident light passes through said lens and is reflected from said first reflective surface to said second reflective surface, and is reflected from said second reflective surface so as to pass through said lens and is reflected generally back towards its source, and wherein said first and second reflective surfaces intersect at a curved edge.

4,930,871
NEEDLE THREADER
Bernice B. Tannahill, 4325 Woodlawn, Beaumont, Tex. 77703
Filed Aug. 15, 1988, Ser. No. 231,879
Int. Cl.[5] G02B 7/02
U.S. Cl. 350—243 9 Claims



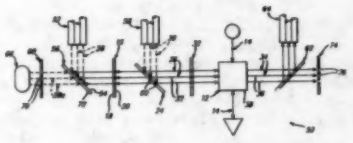
6. A needle threader for facilitating the insertion of an end of a thread in an eye of a needle, the needle threader comprising:
a magnifying lens holder,
a magnifying lens held by the magnifying lens holder, and
a background contrast member connected to the lens holder and spaced apart therefrom,
the background contrast member having at least one colored area for making it easier to see a thread placed between the magnifying lens and the background contrast member.

4,930,872
IMAGING WITH COMBINED ALIGNMENT FIXTURING, ILLUMINATION AND IMAGING OPTICS
Joseph J. Convery, 3182 Briar Hill, Milford, Mich. 48042
Filed Dec. 6, 1988, Ser. No. 280,718
Int. Cl.[5] G02B 27/00, 23/26
U.S. Cl. 350—321 17 Claims



12. A unitary structure imaging system for producing an electronic image of a region of a surface comprising:
a physical standoff structure generally symmetrical about a primary axis including
a distal ring disposed perpendicular to said primary axis for contacting the surface surrounding the region to be imaged, said distal ring having a distal opening permitting view of the region to be imaged along said primary axis,
a disposable distal cap mounted on said distal ring having a distal cap opening corresponding to said distal opening, whereby said distal cap can be mounted on said distal ring prior to producing the electronic image of the region of the surface and then discarded for preventing cross contamination between differing surfaces,
a proximal ring disposed perpendicular to said primary axis having a proximal opening permitting view of the region to be imaged along said primary axis, and
a support structure coupled to said distal ring and said proximal ring for separating said distal ring and said proximal ring by a predetermined distance along said primary axis;
an illuminator generating electromagnetic radiation of a predetermined spectrum disposed to uniformly illuminate said distal opening;
an optical system disposed in said proximal opening having an optical axis coincident with said primary axis for focusing on a focal plane an image of electromagnetic radiation of said predetermined spectrum reflected from objects located at a predetermined objective plane of said optical system, said predetermined objective plane being parallel to said distal ring at a location corresponding to an expected position of the region of the surface to be imaged as determined by said predetermined distance of said support structure; and
an electronic imaging device disposed at said focal plane of said optical system responsive to electromagnetic radiation of said predetermined spectrum for generating an electronic signal corresponding to said image of electromagnetic radiation of said predetermined spectrum focused on said focal plane by said optical system, said optical system and said electronic imaging device cooperating together to produce a field of view at said predetermining objective plane concentric with said primary axis and corresponding to said distal opening.

4,930,873
OPTICAL FLIP-FLOP
Bryan D. Hunter, P.O. Box 93, Vanderbilt, Mich. 49795
Filed Sep. 23, 1988, Ser. No. 248,136
Int. Cl.[5] G02F 1/35
U.S. Cl. 350—354 17 Claims



1. An optical flip-flop comprising:
a phase-conjugating mirror;
a reflective element facing said phase-conjugating mirror;
means for initiating a reference beam of coherent electromagnetic radiation reflecting continuously between said phase-conjugating mirror and said reflective element along a path therebetween;
means for terminating said reference beam; and
means for deriving an output beam from said reference beam, said output beam being present only during such continuous reflection of said reference beam between said phase conjugating mirror and said reflective element.

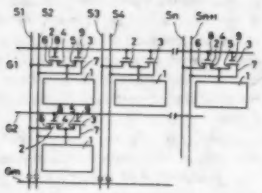
4,930,874
LIQUID CRYSTAL DISPLAY DEVICE
Toshifumi Mitsumune, Kobe; Hiroshi Take, Ikoma, and Kiyoshi Nakazawa, Fujiidera, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan
Filed Sep. 28, 1988, Ser. No. 250,696
Claims priority, application Japan, Dec. 18, 1987, 62-322257
Int. Cl.[5] G02F 1/13; G09G 3/00
U.S. Cl. 350—333 9 Claims

1. A liquid crystal display device comprising:
an insulating substrate;

a plurality of transparent electrodes disposed on the insulating substrate in a matrix fashion to thereby form a plurality of pixels arranged in columns and rows;

a plurality of thin film transistors (TFT) connected to each of the transparent electrodes on the insulating substrate, each thin film transistor having a drain electrode, a source electrode and a gate electrode, in which the drain electrode of each TFT is connected to its corresponding transparent electrode;

a common gate electrode line for each row of transparent electrodes disposed on the insulating substrate, each gate



electrode of the thin film transistors connected to each of the transparent electrodes in each row being connected in common thereto; and

a plurality of source electrode lines for each column of the transparent electrodes disposed at a right angle to the common gate electrode lines on the insulating substrate the number of the source electrode lines for each column being equal to the number of the thin film transistors connected to one transparent electrode, wherein the thin film transistors connected to each transparent electrode of each column being connected to a different of said plurality of source electrode lines of each respective column.

4,930,875

SCANNING DRIVER CIRCUIT FOR FERROELECTRIC LIQUID CRYSTAL DEVICE

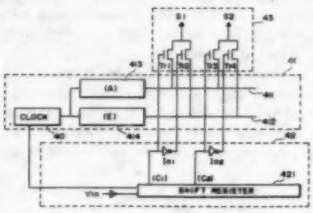
Hiroshi Inoue, Yokohama; Yoshiyuki Osada, Atsugi, and Yutaka Inaba, Kawaguchi, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 15,674, Feb. 17, 1987, abandoned. This application Jun. 27, 1989, Ser. No. 372,169

Claims priority, application Japan, Feb. 17, 1986, 61-032480; Feb. 18, 1986, 61-034729

Int. Cl.[5] G02F *1/13*; G09G *3/36*

U.S. Cl. 350—333 **24 Claims**



1. A driving apparatus, comprising a scanning driver circuit connected to scanning electrodes and a signal driver circuit connected to signal electrodes, said scanning driver circuit comprising:

(1) a driver signal voltage generating unit which includes:

a first signal voltage generating unit comprising:

a first circuit for generating a scanning selection signal including a sequence of three voltages comprising a voltage of one polarity, a voltage of the other polarity, and zero voltage, and

means for controlling said first circuit so as to generate the sequence of three voltages in different phases and for continuously supplying the scanning selection signal comprising the sequence of three voltages to a first bus, the polarities and the zero level of the voltages being defined with respect to a scanning nonselection signal voltage, and

a second signal voltage generating unit for generating a scanning nonselection signal voltage continuously supplied to a second bus;

(2) a switching circuit unit for selectively supplying the scanning selection signal or the scanning nonselection signal to a scanning electrode; and

(3) a switching signal generating unit for supplying a switching control signal to the switching circuit unit.

4,930,876

LIQUID CRYSTAL DISPLAY DEVICE

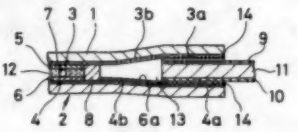
Takumi Suzuki, Machida; Kiyohiro Uehara, Tokyo, and Hisao Takahashi, Atsugi, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Oct. 27, 1988, Ser. No. 263,272

Claims priority, application Japan, Oct. 30, 1987, 62-165375; Dec. 19, 1987, 62-320087; Jul. 26, 1988, 63-184680

Int. Cl.[5] G02F *1/13*

U.S. Cl. 350—336 **4 Claims**



1. A liquid crystal display device comprising:

a pair of transparent baseplates which are opposed to each other;

a pair of transparent electrodes each disposed on an inner surface of each of the baseplates;

a sealing member disposed so as to form a chamber between the baseplates for containing therein the transparent electrodes and a liquid crystal;

an orientating material covering at least one of said baseplates inside said chamber;

a pair of contact electrodes each disposed on one end portion of the inner surface of each of the baseplates for contacting with a pair of external electrodes to be inserted into said device, from said external electrodes a signal to control optical transmission/screening of the liquid crystal being received;

a pair of connecting electrodes each disposed on the inner surface of each of the baseplates for electrically connecting the contact electrodes with the transparent electrodes in order to transmit the signal from the contact electrodes to the transparent electrodes; and

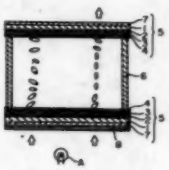
an insulating film having substantially the same thickness and composition as said orientating material placed in those areas of said at least one baseplate that are not contacted by said contact electrodes and not inside said chamber.

4,930,877

LIQUID CRYSTAL DISPLAY

Mitsuru Kano, Furukawa; Kenji Miyagawa, Nagoya; Masahiko Yamaguchi, and Eiji Imaizumi, both of Furukawa, all of Japan, assignors to Alps Electric Co., Ltd., Tokyo, Japan

Filed Oct. 27, 1988, Ser. No. 263,468
Claims priority, application Japan, Feb. 23, 1988, 63-40486
Int. Cl.[5] G02F *1/13*
U.S. Cl. 350—339 F **1 Claim**



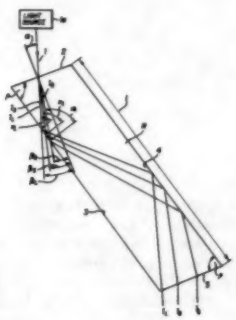
1. A liquid crystal display comprising a pair of substrates; a liquid crystal composition sealed between said substrates, said liquid crystal composition having a twist angle set within a range of 180–300 degrees and a retardation set within a range of 0.45–0.7 μm, wherein when an electric field is applied, said liquid crystal display is in a dark state, while when the electric field is not applied, said liquid crystal display is in a bright state; and a filter laminated on the outside of said substrates, said filter having a hue complementary to that of an image color of said liquid crystal display in the bright state.

4,930,878

ACHROMATIC PHASE RETARDER ARRANGEMENT

Joachim Bergner, Jena; Rainer Danz, Kahla, and Hartmut Heinz, Jena, all of German Democratic Rep., assignors to Jenoptik Jena GmbH, Jena, German Democratic Rep.

Filed Sep. 20, 1988, Ser. No. 247,022
Int. Cl.[5] G02F *1/01*; G02B *5/04*
U.S. Cl. 350—394 **2 Claims**



1. In an achromatic phase retarder arrangement comprising at least one prismatic body with two total reflection surfaces and a source of a light beam directed toward said body, the improvement wherein

the body has a light entry surface at an angle of incidence (α) different from 90° to the incidence direction of the light beam, wherein

the light beam has an incident angle (α) at the light entry surface so that the difference between the angles of refraction of the short wavelength light and a medium wavelength light or the difference between the angles of refraction of medium wavelength light and long wavelength light is identical with the difference between the corresponding angles of incidence (θ_K, θ_S, θ_L) at the first total reflection surface according to the relation:

$$|\arcsin(\sin\alpha/n_S)-\arcsin(\sin\alpha/n_K)|=|\theta_S-\theta_K|$$

or

$$|\arcsin(\sin\alpha/n_L)-\arcsin(\sin\alpha/n_S)|=|\theta_L-\theta_S|$$

wherein

α is the angle of incidence of the light entry surface,

n_L is the refractive index for medium wavelength light,

n_K is the refractive index for short wavelength light,

θ_L is the angle of incidence for long wavelength light,

θ_S is the angle of incidence for medium wavelength light,

θ_K is the angle of incidence for short wavelength light, and

$\phi=\theta_S+\arcsin(\sin\alpha/n_S)$, and wherein

a first total reflection surface of the body makes an angle (ϕ) with the light entry surface, the two angles (α, ϕ) being selected so that, for a light beam of short wavelength, refracted at the light entry surface, an angle of incidence (θ_K) results at the first total reflection surface, which is larger than the angle of incidence (θ_L) of a refracted light beam of a longer wavelength, and a second surface of total reflection of the body is parallel to the first surface of total reflection, and a light exit surface of the body refracts the refracted and reflected light beams (1_L, 1_S, 1_K) and is parallel to the light entry surface.

4,930,879

SYNTHETIC RESIN LENS

Takeaki Iryo; Satoshi Kubota, both of Nagano; Yoshio Sano, Okaya; Yoshishige Murata, Tsukuba, and Yasumi Koinuma, Oita, all of Japan, assignors to Nippon Oil and Fats Co., Ltd. and Seiko Epson Corp., both of, Japan

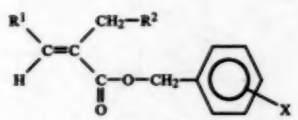
Continuation-in-part of Ser. No. 27,562, Mar. 18, 1987, abandoned. This application Sep. 26, 1988, Ser. No. 249,314
Int. Cl.[5] G02B *3/00*
U.S. Cl. 350—409 **18 Claims**

1. A synthetic resin lens having a surface hard coating comprising:

a synthetic resin lens body; and

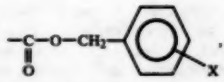
a surface hard coat deposited on the lens body; the synthetic resin lens body being made of a resin obtained by copolymerizing monomers consisting essentially as synthetic resinous components of;

10 to 80 percent by weight of at least one diester of dicarboxylic acid having the following formula (1) of



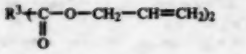
(1)

wherein R^1 and R^2 are different groups, one of R^1 and R^2 being a hydrogen atom, the other being



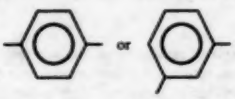
and X represents a hydrogen atom, a chlorine atom, a bromine atom or an iodine atom,

10 to 80 percent by weight of at least one allyl compound having the following formula (2) of



(2)

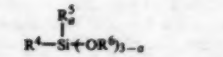
wherein R^3 represents —O—CH_2—CH_2—O—,



and n represents an integer of 1 or 3, and 5 to 50 percent by weight of diethyleneglycol bis(allylcarbonate),

said surface hard coat being formed by curing a coating composition comprising;

50 to 800 parts by weight of at least one organic silicon compound having the following formula (3) of



(3)

wherein R^4 represents a hydrocarbon group having 1 to 6 carbon atoms, or an organic group including a vinyl group, a methacryloxy group of an epoxy group. R^5 represents a hydrocarbon group having 1 to 4 carbon atoms, R^6 represents a hydrogen atom, a hydrocarbon group having 1 to 5 carbon atoms or an alkoxyalkyl group and the symbol a represents an integer of 0 or 1,

100 parts by weight of colloidal silica having a particle size of 1 to 100 millimicrons.

50 to 600 parts by weight of a polyfunctional compound selected from the group consisting of a polyfunctional epoxy compound, a polyalcohol, a polycarboxylic acid, a polycarboxylic anhydride, and mixtures thereof, and

0.01 to 5.0 percent by weight of a curing catalyst based on the residual solids in the composition after curing.

4,930,880

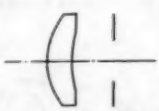
GRADED REFRACTIVE INDEX LENS

Yuji Miyauchi, Kanagawa, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Oct. 6, 1989, Ser. No. 418,323

Int. Cl.[5] G02B *3/00*

U.S. Cl. 350—413 **5 Claims**



1. A graded refractive index lens having refractive index distribution in the direction along the optical axis, and so designed as to satisfy the following conditions (1) and (2):

(1) $-1.5<(f_p\gamma_p+f_n\gamma_n)/(\gamma_p+\gamma_n)d<4.5$

(2) $|f_p/f_n|>0.6$

wherein the reference symbol f_p represents an inverse number of the power at the vertex of the convex surface of said lens, the reference symbol f_n designates an inverse number of the power at the vertex of the concave surface of said lens, the reference symbol γ_p denotes Abbe's number at the vertex of the convex surface of said lens, the reference symbol γ_n represents Abbe's number at the vertex of the concave surface of said lens and the reference symbol d designates thickness of said lens.

4,930,881

IMAGE PICKUP OPTICAL SYSTEM

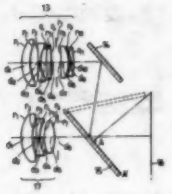
Hiroshi Takase, Hachiouji; Hisashi Goto, Akishima; Takashi Inoue, Hachiouji; Hidenori Sakurai, Hachiouji, and Akiteru Kimura, Hachiouji, all of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Nov. 17, 1988, Ser. No. 272,420

Claims priority, application Japan, Nov. 19, 1987, 62-290584

Int. Cl.[5] G02B *17/00, 5/08, 27/18*

U.S. Cl. 350—445 **12 Claims**



1. An image pickup optical system comprising a first imaging lens and a second imaging lens arranged so as to set the optical axes thereof in substantially parallel to each other and having focal lengths different from each other, an image forming surface disposed on the optical axis of said second imaging lens, a second reflecting mirror removably arranged in the optical path of said second imaging lens at a location between said second imaging lens and the image forming surface, and a first reflecting mirror arranged on the optical axis of said first imaging lens and having a function to reflect the incident light to said second reflecting mirror, said second reflecting mirror having a reflecting surface whose area is larger than the cross-sectional area of the light bundle made incident thereon by way of said first reflecting mirror, and reflectance being varied so as to be lowered outward on at least a portion of the marginal area located outside the effective reflecting area of said second reflecting mirror.

4,930,882

ADJUSTABLE MICROSCOPE FOCUSING DRIVE

Herbert Koch, Biebertal, and Peter Weimar, Staufenberg, both of Fed. Rep. of Germany, assignors to Ernst Leitz Wetzlar GmbH, Wetzlar, Fed. Rep. of Germany

Filed Nov. 30, 1988, Ser. No. 277,953

Claims priority, application Fed. Rep. of Germany, Dec. 1, 1987, 8715891[U]

Int. Cl.[5] G02B *21/26*

U.S. Cl. 350—530 **17 Claims**

1. An electromotively adjustable focusing system for a microscope comprising:

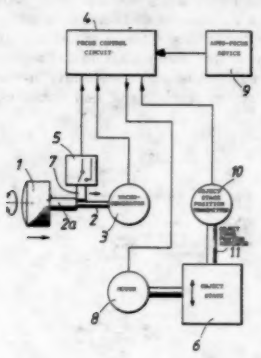
an adjustable microscope object stage;

means for electromotively moving the object stage and, thereby, focusing the microscope;

a generator for generating selective electrical signals, such signals causing either coarse or fine adjustment of the microscope;

means for manually controlling the output of the generator, said generator producing electrical signals proportional to the degree of movement of said manual control means; and

means for applying the selectively generated electrical signals to the electromotive moving means, whereby the



microscope is, in response, respectively coarsely or finely focussed.

4,930,883

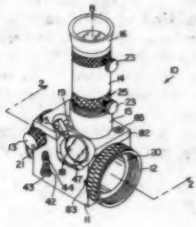
PHOTOVISUAL STAR DIAGONAL

Ronald H. Salzman, 250-D Brennan St., Manchester, N.H. 03103

Continuation of Ser. No. 69,861, Jul. 6, 1987, abandoned. This application Jan. 19, 1989, Ser. No. 299,889

Int. Cl.[5] G02B *7/20, 7/18, 23/02, 23/16*

U.S. Cl. 350—574 **1 Claim**



1. A photovisual star diagonal for use with telescopes to simplify astrophotography, comprising:

a body having:

a front end;

a rear end;

a top, and

a cavity extending from said front end to said rear end of said body and through said top of said body;

first coupling means positioned near said front end of said body for attaching a first optical device thereto for viewing through said cavity of said body along a first axis;

second coupling means positioned near said rear end of said body for attaching a second optical device thereto and orienting said second optical device for viewing along said first axis;

third coupling means positioned near said top of said body oriented substantially perpendicularly to said first and second coupling means for attaching a third optical device thereto for viewing through said top of said body into said cavity of said body along a second axis oriented substantially perpendicularly to said first axis;

first adjustment means for adjusting the distance between said third optical device and said first axis;

a multi-position mirror positioned inside said cavity in said body and oriented so that when said mirror is in a first position, viewing from said first optical device to said second optical device is substantially unimpaired, and when said mirror is in a second position, a viewing path is established between said third optical device and said first optical device;

control means for changing the position of said multi-position mirror from said first position to said second position and from said second position to said first position consisting of a rod to which said multi-position mirror is attached which has at least two flattened areas and a knob to facilitate adjustment of said multi-position mirror;

locking means for holding said multi-purpose mirror in said first position and in said second position consisting substantially of a spring-loaded contact which contacts one of said two flattened areas;

second adjusting means for adjusting the position of said multi-position mirror with respect to said first axis, and

third adjusting means for adjusting the orientation of said multi-position mirror with respect to said second axis.

4,930,884

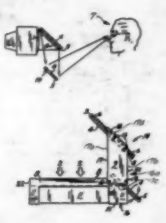
EASY VIEWING DEVICE WITH SHIELDING

Clyde L. Tichenor, Van Nuys; Paris E. Royo, Yuba City, and Alex W. Fleming, San Juan Capistrano, all of Calif., assignors to Designs by Royo, San Juan Capistrano, Calif.

Continuation-in-part of Ser. No. 180,438, Apr. 12, 1988, abandoned, which is a continuation-in-part of Ser. No. 167,641, Mar. 14, 1988, abandoned. This application Mar. 3, 1989, Ser. No. 320,238

Int. Cl.[5] G02B *5/08*

U.S. Cl. 350—624 **37 Claims**



1. A device for viewing a computer monitor screen comprising:

a first mirror positioned to reflect an image from a computer monitor screen;

means for supporting and positioning the first mirror;

a second mirror positioned to reflect the image reflected by the first mirror toward the eyes of a viewer, wherein either the first or the second mirror is a partial mirror; and

means for supporting and positioning the second mirror.

4,930,885

EYEGLASSES WITH RELEASABLE HEADBAND SUPPORT ARRANGEMENT

Brian J. Laschober, 17259 Oleander, Tinely Park, Ill. 60477

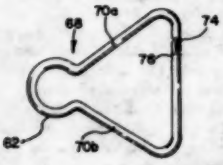
Filed Sep. 14, 1988, Ser. No. 244,266

Int. Cl.[5] G02C *3/00*; A61F *9/02*

U.S. Cl. 351—156 **3 Claims**

1. A pair of eyeglasses including a frame for supporting a pair of lenses, said frame provided at each side with an integral connector member extending rearwardly from said frame, said connector member defining a recess having a pair of side walls and an opening at the rear thereof, one of said side walls defining an aperture therethrough; a pair of attachment members, each adapted for releasable securement with said respective connector member; one end of each said attachment member provided with a slot therethrough and the other end of each

said attachment member adapted for insertion into said recess and provided with a resilient lock member adapted to cooperate with said aperture in said one side wall to releasably secure said attachment member within said recess of said connector member; a stretchable headband, each end of which is secur-



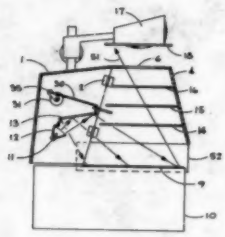
able within one said slot of said attachment member, said headband adapted to secure said eyeglasses on the head of a wearer, thereby eliminating temple bows; wherein said headband may be readily attached to and disconnected from said frame of said eyeglasses.

4,930,886

OPAQUE ADAPTER FOR OVERHEAD PROJECTOR

Richard E. Williams, Lake Mary, and Lewis W. Slimak, Orlando, both of Fla., assignors to Numa Corporation, Lake Mary, Fla.

Filed Dec. 8, 1988, Ser. No. 281,180
Int. Cl.[5] G03B *21/08, 21/28*
U.S. Cl. 353—97 **8 Claims**



1. A device to provide opaque projection in an overhead projector having a stage, comprising:

a light-intercepting hood positioned over said stage;

a pair of controllable clamshell doors affixed to said hood by pivotal means slanted relative to vertical so as to cause said doors to move up and away from said stage when said doors are opened; and

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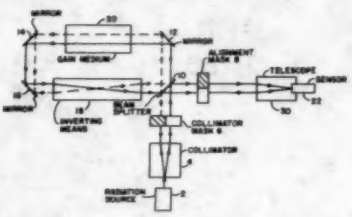
4,930,887

APPARATUS AND METHOD FOR ALIGNING RING RESONATOR

Richard H. Buras, Los Angeles, Calif., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Nov. 25, 1988, Ser. No. 277,591
Int. Cl.[5] G01B *11/26, 9/02*
U.S. Cl. 356—152 **10 Claims**

1. A device for aligning a ring resonator, comprising: a ring resonator having a plurality of adjustable mirrors for directing beams through said resonator, a beam splitter for dividing an impinging beam of radiation into transmitted and reflected beam portions, said transmitted portion being directed through said resonator and outcoupled through said beam splitter for subsequent recombination with said reflected beam portion, means for inverting said transmitted beam portion within said resonator, a source of radiation for producing a beam, a first mask, means for directing said beam from said source toward said first mask, said first mask being suitably disposed between said means for directing and said beam splitter to attenuate intensity of a portion of said beam from said source, said mask disposition permitting rotation of said mask in the plane perpendicular to the beam path from said source, a second mask disposed adjacent to said beam splitter in the path of the recombined beam consisting of said transmitted and reflected



beam portions to attenuate intensity of said reflected beam portion, said second mask disposition permitting rotation of said second mask in the plane perpendicular to the beam paths from said beam splitter, and means for focusing and sensing said transmitted and reflected beam portions after passing through said second mask for materializing said beam portions in the form of spots, said focusing and sensing means being located along a linear path of said transmitted and reflected beam portions after passing through said second mask.

4,930,888

SITUATION DISPLAY SYSTEM FOR ATTACHMENT TO A HEADGEAR

Horst Freisleben, Grafing; Gottfried Scharfenberg, Siegertsbrunn; Gunther Sepp, Ottobrunn; Richard Benedikter, Putzbrunn, and Werner Schnaebele, Wolfratshausen, all of Fed. Rep. of Germany, assignors to Messerschmitt-Boelkow-Blohm Gesellschaft mit beschraenkter Haftung, Munich, Fed. Rep. of Germany

Filed Oct. 31, 1988, Ser. No. 265,217
Claims priority, application Fed. Rep. of Germany, Nov. 7, 1987, 3737972
Int. Cl.[5] G01B *11/26*
U.S. Cl. 356—152 **8 Claims**

1. A situation display system for superimposing visible elements with respect to oa real map background by means of a projector attached to a headgear (10), comprising at least three marking light sources (13) arranged not on a line, but orthogonally to each other, and wherein as a sensor (11) for the alignment, a position sensitive diode (17) is arranged at said headgear of a viewer, said sensor (11) being of a planar construction behind an objective (18) of determined focal length, said position sensitive diode (17) having electrodes (17*a*) along its edges functioning as current dividers for providing information regarding a position of a light spot in two orthogonal directions,

said position information being in the form of analog electrical values for producing the angular position of said sensor (11) at said headgear relative to said marking light sources (13), and computer means (14) for ascertaining in real time from said angular position a projection direction for said visible elements and a distance between said headgear (10) and said real map (12), said system further comprising a symbol remote control device (15) for individually controlling said superimposing.

4,930,889

METHOD OF AND INSPECTING APERTURED MASK SHEETS

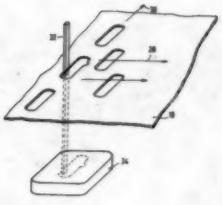
Bastiaan J. Van Donselaar, and Willem D. Van Amstel, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jul. 18, 1988, Ser. No. 220,850

Claims priority, application United Kingdom, Jul. 22, 1987, 8717306

Int. Cl.[5] G01N *21/88*

U.S. Cl. 356—237 **31 Claims**



1. A method of inspecting an apertured mask sheet, characterised by providing relative movement between an apertured mask sheet and a source of radiant energy along a path of movement; producing, by scanning across the mask sheet in a direction transverse to said path of movement, a grey level signal corresponding to radiant energy passed by apertures in the mask sheet; deriving from the grey level signal a plurality of peak signals which correspond to the maximum transmission of each of the apertures scanned; and successively comparing the peak signals with at least one reference value to determine whether the transmission of each aperture scanned is acceptable.

4,930,890

METHOD AND APPARATUS FOR DETECTING THROUGH-HOLE VOIDS IN MULTI-LAYER PRINTED WIRING BOARD

Yasuhiko Hara, Machida, and Kenzo Eado, Hadano, both of Japan, assignors to Hitachi Ltd., Tokyo, Japan

Filed Jun. 22, 1988, Ser. No. 210,097

Claims priority, application Japan, Jun. 25, 1987, 62-156555

Int. Cl.[5] G01N *21/88*

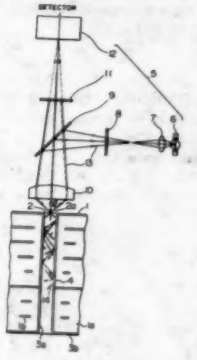
U.S. Cl. 356—241 **22 Claims**

1. A method of detecting a through-hole void existing on a surface of a through-hole which is formed with an electrical conductor for interconnecting wiring patterns of upper layers and wiring patterns of lower layers in a multi-layer printed circuit board comprising the steps of:

emitting an exciting beam having a wavelength limited to a value within an optimum wavelength band which is capable of exciting a fluorescent light through said through-hole void from a layer material which is exposed at the through-hole void;

focusing said exciting beam over said through-hole and illuminating said through-hole with said exciting beam by a focusing/illuminating optical system in which said exciting beam has an incident angle which is not less than 10° in order to let said exciting beam reflect many times between said surface of said through-hole such that said exciting beam impinges upon said layer material in an almost horizontal direction through said through-hole void;

converging said fluorescent light emitted into said through-hole from said through-hole void, by means of said focusing optical means at an illuminating side;



filtering said fluorescent light; and,

detecting said through-hole void for its presence on the basis of an electrical signal converted by a photoelectric conversion means which detects said converged fluorescent light after filtering.

4,930,891

METHOD AND APPARATUS FOR SCANNING WAVELENGTH IN SPECTROPHOTOMETERS

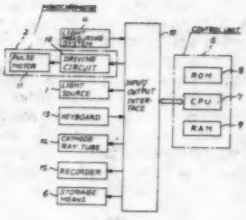
Tatsumi Sato, Kyoto, Japan, assignor to Shimadzu Corporation, Japan

Filed Nov. 23, 1988, Ser. No. 275,362

Claims priority, application Japan, Dec. 14, 1987, 62-318170

Int. Cl.[5] G01J *3/06, 3/42*

U.S. Cl. 356—326 **8 Claims**



1. Method of scanning wavelength in a spectrophotometer which comprises a light source, a monochromator for dispersing the light from said light source into a sequence of wavelengths, a sample chamber containing a sample to be analyzed, optical means for introducing the monochromatic light of a selected one of said wavelengths into said sample chamber to impinge on said sample, means for measuring the light from said sample to produce a corresponding output electrical signal, and a controller in which the conditions for wavelength scanning of said monochromator are set and which controls the wavelength scanning operation of said monochromator in accordance with said set conditions and processes said output electrical signal to obtain the spectral data of said sample; said method comprising:

setting in said controller as one of said conditions a wavelength range over which wavelength scanning is conducted at a predetermined relatively fast constant speed and within said wavelength range at least one wavelength at which wavelength scanning is stopped temporarily for a predetermined period of time long enough to allow stabilization of said output electrical signal from said light measuring means and enable subsequent sampling after said output signal has been sufficiently stabilized;

and conducting wavelength scanning in accordance with said set conditions.

4,930,892

PHOTODIODE ARRAY SPECTROMETER

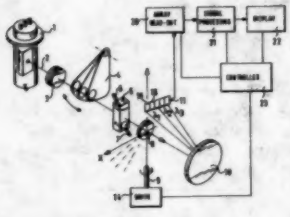
Detlev Hadbawnik, Waldbronn, and Karsten Kraiczek, Karlsbad, both of Fed. Rep. of Germany, assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Sep. 23, 1988, Ser. No. 248,511

Claims priority, application European Pat. Off., Dec. 18, 1987, 87118796.9

Int. Cl.[5] G01J *3/18*

U.S. Cl. 356—328 **8 Claims**



1. A photodiode array spectrometer for determining the spectral composition of a polychromatic beam of radiation comprising:

diffraction means for receiving the polychromatic beam of radiation and for generating therefrom a diffracted beam comprising a plurality of spatially separated diffracted rays of different wavelengths;

a photodiode array for receiving at least a portion of the diffracted beam, with the array comprising a plurality of photodiodes intercepting different wavelength ranges of the diffracted beam, each wavelength range comprising a plurality of diffracted rays of different wavelengths;

displacement means for adjusting, in a plurality of discrete steps, the relative position of said diffracted beam and said photodiode array such that a majority of said diffracted rays that are received by said photodiode array impinge upon at least one photodiode at some relative position; and

processing means coupled to said photodiode array for receiving and processing a plurality of spectral signals corresponding to said plurality of discrete steps.

4,930,893

ELECTROPHORESIS IMAGING SYSTEM

Bala S. Manian, Saratoga, Calif., assignor to Molecular Dynamics, Sunnyvale, Calif.

Filed Mar. 25, 1988, Ser. No. 173,434

Int. Cl.[5] G01N *21/41*; G01B *9/02*

U.S. Cl. 356—344 **6 Claims**

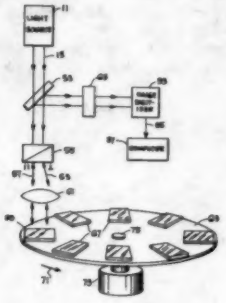
1. An electrophoretic measuring system comprising,

a gel electrophoresis unit having gel material and sample material thereon,

a light source emitting a collimated beam, said beam being directed toward said electrophoresis unit, said beam passing through said gel and sample material on said unit,

shearing interferometer means disposed in the path of said light beam for producing an interferogram representing the spatial rate of change of an index of refraction of said material on said unit, said shearing interferometer means including a pair of closely spaced first and second plates in the path of said light beam, said first plate being partially reflection and partially transmissive, said second plate being in communication with means for altering the separation between said first and second plates,

means for forming an image of said interferogram,



means for producing a data signal from said image representing said interferogram, and

means for processing said data signal to obtain the concentration of sample material at each position on said unit, said means for processing including means for solving

(a) a first equation:

$$I(x) = I_0(x) + I_1(x)\cos\left(\frac{2\pi}{\lambda}\Delta_0(x)\right)$$

obtained for a first plate separation Z_0,

(b) a second equation:

$$I(x) = I_0(x) - I_1(x)\sin\left(\frac{2\pi}{\lambda}\Delta_0(x)\right)$$

obtained for a second plate separation $Z_0+\lambda/4$, and

(c) a third equation:

$$I(x) = I_0(x) - I_1(x)\cos\left(\frac{2\pi}{\lambda}\Delta_0(x)\right)$$

obtained for a third plate separation $Z_0+\lambda/2$, for $\Delta_0(x)$, where $I(x)$ is the light intensity of said interferogram, $I_0(x)$ is the light intensity of light reflected from said first plate, $I_1(x)$ is the light intensity of the light transmitted through said first plate and reflected from said second plate, $\Delta_0(x)$ is an optical path difference for said light beam through said gel and sample material on said unit, x is the position with respect to said electrophoresis unit and λ is the wavelength of said light beam.

4,930,894

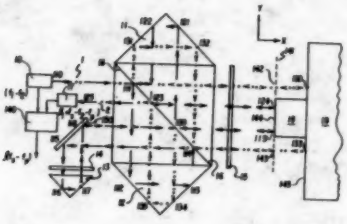
MINIMUM DEADPATH INTERFEROMETER AND DILATOMETER

Richard R. Baldwin, Saratoga, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Continuation of Ser. No. 58,451, Jun. 5, 1987, abandoned, which is a division of Ser. No. 604,702, Apr. 27, 1984, Pat. No. 4,711,574. This application Jul. 14, 1988, Ser. No. 220,899

Int. Cl.[5] G01B 9/02

U.S. Cl. 356—351 **17 Claims**



1. A minimum deadpath interferometer for measuring the change in optical path length of an optical beam between a sample plane and a reference plane, said interferometer comprising:

a first reflecting surface coplanar with the sample plane;

a second reflecting surface coplanar with the reference plane; and

optical means having a plurality of elements including a polarizing beam splitter for transmitting a beam of a first polarization and reflecting a beam of a second polarization,

for producing a first optical beam and a second optical beam from light supplied from a light source, said first and second beams being directed along paths that are common mode except for the portion of their paths between the sample and reference planes;

for directing the first beam along a first beam path that reflects off of said first reflecting surface;

for directing the second beam along a second beam path that reflect off of said second reflecting surface;

for directing said reflected first and second beams into an output beam in which the first and second beams overlap and in which the first and second beams are substantially parallel, such parallelism being substantially independent of small rotations of the first reflecting surface, of the second reflecting surface and of the elements of the optical means.

4,930,895

ENCODER FOR FORMING INTERFERENCE FRINGES BY RE-DIFFRACTED LIGHTS FROM AN OPTICAL TYPE SCALE AND PHOTOELECTRICALLY CONVERTING THE INTERFERENCE FRINGES TO THEREBY DETECT THE DISPLACEMENT OF THE SCALE

Tetsuharu Nishimura, Kawasaki; Masaaki Tsukiji; Satoshi Ishii, both of Tokyo, and Koh Ishizuka, Urawa, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 10, 1988, Ser. No. 204,727

Claims priority, application Japan, Jun. 15, 1987, 62-148207

Int. Cl.[5] G01B 9/02

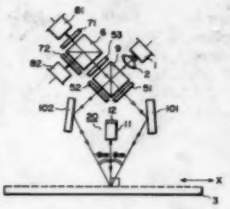
U.S. Cl. 356—356 **34 Claims**

34. A device for detecting a displacement of a diffraction grating comprising:

means for emitting first and second diffracted beams whose optical paths overlap each other from the diffraction grating by directing a radiation beam to the diffraction grating;

optical means for causing the first and second diffracted beams to enter the diffraction grating; and

a detector for detecting an interference beam by causing first



and second re-diffracted beams produced by the first and second diffracted beams being diffracted by the diffraction grating to interfere with each other and for converting the interference beam into a signal.

4,930,896

SURFACE STRUCTURE MEASURING APPARATUS

Yoshiaki Horikawa, Hachiouji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 844,168, Mar. 26, 1986, abandoned. This application Mar. 2, 1989, Ser. No. 320,850

Claims priority, application Japan, Mar. 27, 1985, 60-62265

Int. Cl.[5] G01B 11/30

U.S. Cl. 356—376 **8 Claims**

1. A surface structure measuring apparatus for measuring a surface profile of an object, comprising:

a light source;

an objective lens for collecting light emitted from said light source onto a measurement point on a surface to be measured;

at least one light deflecting means disposed between said objective lens and said light source;

optical path splitting means disposed between said light source and said light deflecting means, and positioned closer to said light source than said light deflecting means;

focus detecting means disposed on an optical path split by said optical path splitting means; to detect an amount and direction of a displacement of a collecting point of light reflected from the surface to be measured along the optical axis caused by a displacement of said measurement point along the optical axis from a predetermined position on the optical axis; and

at least a pupil relay lens disposed so as to make an exit pupil of said objective lens conjugate with said light deflecting means,

said light deflecting means being effective to vary the travelling direction of said light emitted from said source with the result that the angle of light incident on said objective lens changes and thereby the collecting point of the light moves in a direction perpendicular to the optical axis on said surface to be measured.

4,930,897

MIXER

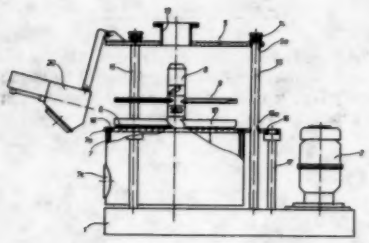
Friedrich W. Herfeld, deceased, late of Neuenrade, and Ute Herfeld, heir, Wall 1, 5982 Neuenrade, both of Fed. Rep. of Germany

Continuation of Ser. No. 816,068, Jan. 3, 1986, abandoned. This application Mar. 2, 1988, Ser. No. 165,459

Claims priority, application Fed. Rep. of Germany, Jan. 25, 1985, 3502557; Aug. 14, 1985, 3529185

Int. Cl.[5] B29B *7/14, 7/16, 7/26;* **B01F** *7/20*

U.S. Cl. 366—98 **17 Claims**



1. In a mixer adapted for mixing plastics materials comprising:

(a) a mixing vessel having a peripheral wall;

(b) an end wall at each end of said peripheral wall for defining with the latter an enclosed mixing chamber between said walls, said peripheral wall defining the side of said chamber;

(c) a rotatable stirrer shaft extending into said chamber and bearing mixing blades for mixing materials in said chamber; and

(d) rotary drive means coupled to said stirrer shaft for rotating the latter and said blades;

the improvement comprising:

(e) means mounting said peripheral wall and one of said end walls for relative movement therebetween axially of said chamber a distance sufficient to provide an opening into said chamber from the periphery of said chamber and enable access to said blades and to the interior of said chamber through said side of said chamber;

(f) means for effecting said relative movement of said peripheral wall and said one of said end walls through said distance; and

(g) sealing and scraping means reacting between said peripheral wall and said one of said end walls for providing therebetween a seal during mixing and a scraper for the interior of said peripheral wall during said relative movement of the latter and said one of said end walls.

4,930,898

PROCESS AND APPARATUS FOR DIRECT ULTRASONIC MIXING PRIOR TO ANALYSIS

Nancy J. Miller-Ihli, Bowie, Md., assignor to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Jun. 27, 1988, Ser. No. 212,390

Int. Cl.[5] B01F *11/00, 11/02;* **G01N** *35/04*

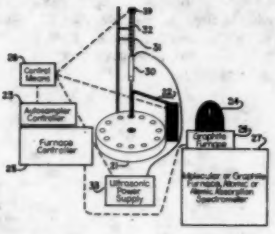
U.S. Cl. 366—109 **21 Claims**

1. An apparatus comprising,

ultrasonic probe means for imparting ultrasonic energy to a sample in order to mix said sample,

analyzer means for analyzing said sample,

and sample conveying means, operatively associated with said analyzer means and said ultrasonic probe means, for



conveying said sample from direct contact with said ultrasonic probe means to said analyzer means.

4,930,899

DOUGH STUFF KNEADER

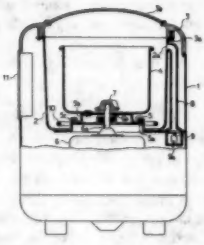
Michishige Aoyama, Nagoya, Japan, assignor to Kabushiki Kaisha Kaisha Toshiba, Kawasaki, Japan

Filed Jun. 23, 1988, Ser. No. 210,377

Claims priority, application Japan, Jun. 29, 1987, 62-162655

Int. Cl.[5] B01F *15/06;* **A47J** *27/00*

U.S. Cl. 366—98 **5 Claims**



1. A dough stuff kneader comprising:

(a) a container for containing dough stuffs at least including water and wheat flour, said container having an upper end which is kept in the open state at least during kneading step;

(b) an electric motor for kneading the dough stuffs contained in said container;

(c) fan means for providing air flow to the interior of said container through the open upper end thereof in the open state;

(d) a signal generating circuit for generating a kneading command signal for driving said motor; and

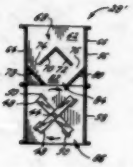
(e) a timer circuit generating a blowing command signal for driving said fan means, after elapse of a predetermined period from the time when the kneading command signal is generated by said signal generating circuit, said predetermined period corresponding to a period for which the dough stuffs are kneaded into a dumpling state, whereby the wheat flour is prevented from being blown out of the container when exposed to the air flow from the fan means.

4,930,900

METHOD AND APPARATUS FOR MIXING LIQUID OR DRY MATERIALS

LaDonne Mitchell, 301 N. Hutton Dr., Newton, Ill. 62448; Larry D. Yargus, 402 N. 7th, Marshall, Ill. 62441; Leon W. Volk, and William A. Volk, both of Newton, Ill., assignors to LaDonne Mitchell, Newton and Larry D. Yargus, Marshall, both of, Ill.

Filed Feb. 1, 1988, Ser. No. 150,538
Int. Cl.[5] B01F 5/04, 7/04, 13/10
U.S. Cl. 366—168 16 Claims



1. A method of impregnating fertilizer with liquid chemicals in a fertilizer mixing and delivery system prior to the final fertilizer and chemical delivery unit, with a minimal amount of contamination of the system, comprising:

providing a fertilizer mixing and delivery system;

providing a fertilizer and chemical mixture delivery unit;

delivering the fertilizer to an impregnation station separate from said fertilizer mixing and delivery system and delivery unit;

mixing said fertilizer in said impregnation station with a desired liquid chemical, providing an impregnating unit having at least two inclined bottom walls and mixing said fertilizer and chemicals by impinging said mixture on said walls and providing baffle means and mixing said fertilizer and chemicals on said baffle means prior to impinging said fertilizer and chemicals on said inclined bottom walls; and

delivering said mixture of fertilizer and chemicals to said delivery unit.

5. An apparatus for impregnating fertilizer with liquid chemicals in a fertilizer mixing and delivery system prior to the final fertilizer and chemical delivery unit, with a minimal amount of contamination of the system, comprising:

a fertilizer mixing and delivery system;

a fertilizer and chemical mixture delivery unit;

an impregnation station and means for delivering the fertilizer to said impregnation system separate from said fertilizer mixing and delivery system and said delivery unit;

means for mixing said fertilizer in said impregnation station with a desired liquid chemical including an impregnating unit having at least two inclined bottom walls and said means for mixing said fertilizer and chemicals include impinging said mixture on said walls and including baffle means and said means for mixing said fertilizer and chemicals include impinging said fertilizer and chemicals on said baffle means prior to impinging said fertilizer and chemicals on said inclined bottom walls; and

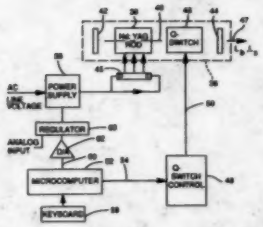
means for delivering said mixture of fertilizer and chemicals to said delivery unit.

4,930,901

METHOD OF AND APPARATUS FOR MODULATING A LASER BEAM

Joel C. Johnson, Lake Oswego, and Richard S. Harris, Portland, both of Oreg., assignors to Electro Scientific Industries, Inc., Portland, Oreg.

Continuation of Ser. No. 289,978, Dec. 23, 1988, abandoned. This application May 26, 1989, Ser. No. 357,979
Int. Cl.[5] H01S 3/10
U.S. Cl. 372—26 17 Claims



1. A laser system for generating laser output light emissions for impingement upon a target, comprising:

(a) a light-amplifying medium;

(b) pumping means for pumping the light-amplifying medium With a succession of light pulses to generate laser output light emissions, successive ones of the light pulses separated by a time interval and each light pulse represented in time with a leading edge and a trailing edge;

(c) a Q-switch cooperating with the light-amplifying medium to provide a first state in which no laser output light emission takes place and a second state in which laser output light emission takes place; and

(d) Q-switch control means for switching the Q-switch to the first state during the time interval between each light pulse and for switching the Q-switch so that it is in the second state for at least a point in time proximal to the leading edge, and between the leading edge and the trailing edge of each light pulse, thereby to provide a laser system that produces laser output light emissions characterized by temporal energy distributions in which there is a higher energy level near the leading edges of the light pulses and a lower energy level near the trailing edges of the light pulses.

4,930,902

NURSING BOTTLES

Akio Yata, 22-13, Nakamaru Kanagawa-Ku, Yokohama-City, Kanagawa-Prefecture, and Kuniko Aida, 671-188, Oogi Yachimata-Cho, Inba-Gun, Chiba-Prefecture, both of Japan

Filed Mar. 3, 1989, Ser. No. 319,153
Claims priority, application Japan, Mar. 5, 1988, 63-52411; Dec. 13, 1988, 63-160876[U]
Int. Cl.[5] A61J 9/02; G01K 1/14, 1/02
U.S. Cl. 374—150 16 Claims

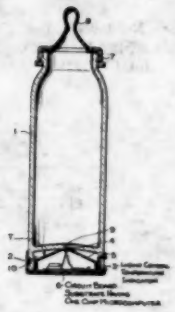
1. A nursing bottle which comprises a bottle for holding a liquid and having an upper opening and a bottom, said upper opening having means for receiving a detachable nipple and a cap;

a detachable case fitted to said bottom of said bottle;

sensor means mounted in said case and contacting said bottle for measuring temperature of said liquid in said bottle and for providing a temperature signal representative of said measured temperature;

electronic circuit means mounted in said case for receiving and processing said temperature signal provided by said

sensor means and for providing an alarm signal responsive to a predetermined temperature;



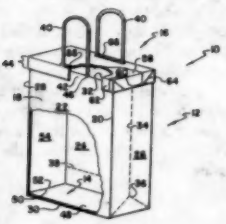
alarm means mounted in said case for receiving said alarm signal and for providing an alarm responsive to said predetermined temperature.

4,930,903

GIFT WRAPPING PACKAGE

William M. Mahoney, North Falmouth, Mass., assignor to William-Maher, Inc., Dallas, Tex.

Filed Jul. 11, 1989, Ser. No. 378,318
Int. Cl.[5] B65D *30/16, 30/20, 33/02, 33/06*
U.S. Cl. 383—6 14 Claims



1. A gift wrapping package comprising

a bag of a sheet of bodily flexible material folded to provide a flat bottom, front and back parallel walls, first and second side walls, and an upper edge, the bag being foldable from a first collapsed position in which the front and back walls substantially juxtapose to an open position in which the front and back walls are substantially parallel and the first and second side walls are substantially perpendicular to the front and back walls providing a rectilinear mouth opening into the bag;

a lid comprising a sheet of backing material substantially more rigid than the bag material including a generally flat upper section and a rectilinear peripheral lip depending from the upper section and an outer decorative sheet of the same material as the bag material, the outer decorative sheet being affixed to the backing sheet, and lid being supported on the upper bag edge and closing the mouth in the open position of the bag;

a handle affixed to the bag and of a length sufficient to extend past the lid and mouth; and

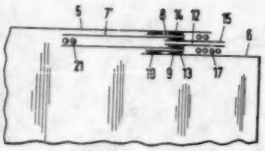
an insert, in the bag, holding the bag in the open position.

4,930,904

CROSS-BOTTOM OR BLOCK-BOTTOM VALVE SACK

Alois Gröner, Lengerich, Fed. Rep. of Germany, and Fabien Rencurosi, Liége, Belgium, assignors to Bischof und Klein GmbH & Co., Lengerich, Fed. Rep. of Germany

Filed Jan. 18, 1989, Ser. No. 298,372
Claims priority, application Fed. Rep. of Germany, Sep. 5, 1988, 8811184[U]
Int. Cl.[5] B65D *30/24*
U.S. Cl. 383—45 23 Claims



1. A bag comprising a foldable bag material formed into a bag having at least one end with a corner, end closure means formed by said bag material and closing off said one end of said bag, a filter valve tube means extending within said end closure means at said one corner, said tube means having an inner end disposed within the interior of said bag such that said tube means is adapted to receive a filler nozzle of a pneumatic filling device for filling said bag with a filling material, said tube means having an inner end portion and an outer end portion, said inner end portion having a cross-sectional contraction which is contracted relative to said outer end portion such that said contracted inner end portion forms a seal with said filler nozzle, said tube means comprising gas release means in the form of a filter material which is gas-permeable but which retains the filling material such that said gas release means is operable to provide for the escape of gases from the bag during filling of the bag while retaining said filling material within the bag.

4,930,905

THERMOPLASTIC BAG WITH INTEGRAL DRAW STRIP AND METHOD OF MANUFACTURE

Gordon V. Sharps, Jr., Fairport, N.Y., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Aug. 22, 1988, Ser. No. 234,657
Int. Cl.[5] B65D *33/28*
U.S. Cl. 383—75 6 Claims

1. Method of forming a thermoplastic bag with separably integral draw strip comprising the steps of:

extruding a tube of thermoplastic film having at least one thicker commonly extruded strip of thermoplastic material separably integral with the tube and extending longitudinally of the tube,

flattening the tube to provide opposed layers of the film,

slitting the flattened tube along one side of the strip to provide a bag opening,

cutting holes in the layers of film of the flattened tube adjacent the strip at predetermined intervals related to the predetermined width of the bag,

folding the strip inwardly between the layers of film of the flattened tube to form a hem in one of the layers enclosing the strip with the strip in alignment with the holes,

sealing the hem to maintain the strip within the hem, and

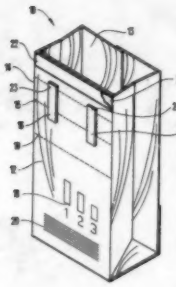
transversely sealing and severing the hem and flattened tube at predetermined intervals corresponding to the predetermined width of the bag.

4,930,906

COOKING GREASE DISPOSAL BAG

Fred S. Hemphill, 3587 Magnolia Ave., Lynwood, Calif. 90262

Filed Aug. 21, 1989, Ser. No. 396,056
Int. Cl.[5] B65D *30/02, 30/16*
U.S. Cl. 383—89 **6 Claims**



1. A cooking grease disposal bag, comprising:

spaced parallel rectangular front and back walls connected by parallel spaced rectangular side walls and a rectangular bottom wall;

each of said walls being of a multi-ply construction having an internal layer of a heavy gage deformable aluminum foil, an intermediate layer formed by a puncture resistant plastic sheet, and an outer layer formed by an insulating paper material;

indicia on said front wall designating first and second spaced transverse fold lines;

and

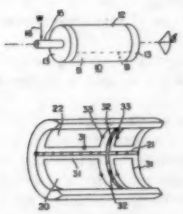
indicia on said front surface between said second fold line and said bottom wall designating a maximum fill line.

4,930,907

STIFF AIR BEARING FOR LARGE RADIAL LOAD

Robert S. Smith, 1263 Emory St., San Jose, Calif. 95126

Filed Jan. 5, 1989, Ser. No. 293,660
Int. Cl.[5] F16C *32/06*
U.S. Cl. 384—118 **29 Claims**



1. An air bearing which includes a rotor with a rotor surface having axial symmetry and two ends having a shaft protruding from at least one of said rotor ends and a location on at least one of said shafts where a radial force, W, may be applied in a force direction, a stator having a chamber enclosing said rotor with an internal surface having axial symmetry and bounded by an end nearest to said force location and an end fartherest from said force location, said chamber internal surface conforming and adjacent to said rotor surface to form an air bearing space, which bearing comprises:

said air bearing space including a plurality of air bearing areas wherein each area is bounded by air escape grooves on said internal surface which communicate with the ambient environment and each area has an air supply passage;

means for supplying air at a single selected pressure to all of said air passages wherein said pressure is proportional to a radial load applied to said rotor;

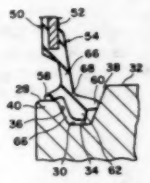
each said area having a size and location with respect to said ends of said axially symmetric internal surface and said single selected pressure is supplied to all of said air passages so that the net moment and force on said rotor is zero when a radial force is applied to said rotor.

4,930,908

SEALED ROLLING BEARING

Hiroyuki Uchida, Yokohama, and Koichi Goto, Fujisawa, both of Japan, assignors to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 7, 1989, Ser. No. 363,044
Claims priority, application Japan, Jun. 16, 1988, 63-78896[U]
Int. Cl.[5] F16C *33/80*
U.S. Cl. 384—480 **7 Claims**



1. A sealed rolling bearing including inner and outer races (10, 12) coaxially arranged with the interposition of rolling members (14), and a pair of sealing plates (50) arranged between both edge portions of an outer peripheral surface of said inner race and corresponding portions of an inner peripheral surface of said outer race, wherein:

fixing grooves (24) each for fixedly receiving a fixing edge portion (56) of each of said sealing plates are formed in both edge portions of the peripheral surface of one of said inner and outer races, and slide grooves (30) each for slidably receiving a slidable seal edge portion of each of said sealing plates are formed in both edge portions of the peripheral surface of the other race, each of said slide grooves having a U-shaped cross-section including a bottom surface (34) and axially outward and inward surfaces (36 and 38) of the bottom surface; and

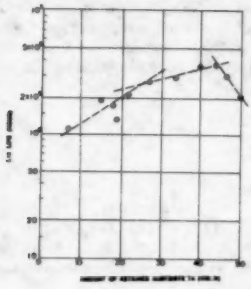
each of said sealing plates comprises an annular core (50) and a flexible seal member (54) integrally fixed to said core, and first, second and third lips (58, 60 and 62) which extend axially outwardly, axially inwardly and substantially radially, respectively are formed on said slidable seal edge portion of each of said sealing plates, said first lip being slidably abutted against a peripheral surface contiguous to said axially outward surface, said second lip being slidably abutted against said axially inward surface, and said third lip being disposed in confronting relation to said bottom surface of each of said slide recesses with a slight clearance therebetween.

4,930,909

ROLLING BEARING

Yasuo Murakami, Yamato; Youichi Matsumoto, and Kazuhiro Uemura, both of Fujisawa, all of Japan, assignors to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 7, 1989, Ser. No. 376,864
Claims priority, application Japan, Jul. 11, 1988, 63-172030
Int. Cl.[5] F16C *33/62*; C21D *9/38*, *9/40*
U.S. Cl. 384—492 6 Claims



1. A rolling bearing, comprising: an inner ring; an outer ring; and a rolling element, at least one of said inner ring, outer ring and rolling element being made of a medium-carbon manganese steel consisting essentially of C: 0.4 to 0.7 wt. %, Si: 0.15 to 1.2 wt. %, Mn: 1.2 to 1.7 wt. %, Al: 200 to 300 ppm, Ti: below or equal to 40 ppm, N:100 to 200 ppm, S: below or equal to 80 ppm, O: below or equal to 9 ppm and the balance of Fe, the medium-carbon manganese steel having been subjected to one of carburizing or carbo-nitriding such that a case of the resulting case-hardened medium-carbon manganese steel includes 25 to 45 vol. % retained austenite.

4,930,910

BEARING ARRANGEMENT

Sanae Mori; Masaaki Sakamoto, both of Nagoya; Takao Wada, Inuyama; Yoshikazu Mizuno, Nagoya, and Masakazu Sato, Utsunomiya, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha

Filed Dec. 23, 1988, Ser. No. 289,299
Claims priority, application Japan, Dec. 26, 1987, 62-330897; Jan. 23, 1988, 63-6665[U]
Int. Cl.[5] F16C *9/04*
U.S. Cl. 384—276 7 Claims

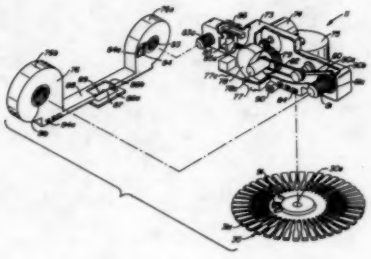
1. A bearing arrangement including a plain bearing consisting of a laminated body of a bearing layer and a backing metal supporting the bearing layer, characterized in that said backing metal is made of a material whose modulus of elasticity is lowered by cold working, and said bearing layer and said backing metal are joined to each other by cold working.

4,930,911

FLAT-BED HEATED FINGER DAISY WHEEL HOT DEBOSSING STAMPER

Craig F. Sampson; Rickson Sun; Paul N. Barsley, all of Palo Alto, and Dennis J. Boyle, Menlo Park, all of Calif., assignors to Taurus Impressions, Inc., Calif.

Continuation of Ser. No. 855,541, Apr. 24, 1986, abandoned.
This application Nov. 28, 1988, Ser. No. 277,399
Int. Cl.[5] B41J *1/30*, *3/28*
U.S. Cl. 400—28 12 Claims



1. In combination, a serial flat bed heated-finger Daisy wheel hot debossing stamper comprising:

a classis having a flat work surface for mounting a workpiece to be debossed;

a gantry connected to said chassis and extending above said working surface;

a debossment assembly movable with respect to said gantry for debossing said workpiece mounted on a portion of said work surface, said debossment assembly comprising:

means for moving said debossment assembly along said gantry parallel to an x-axis of said work surface;

a Daisy-wheel debossment head including a rotating character wheel generally extending in a plane parallel to said work surface and having a series of character fingers thereon individually movable out of a plane of storage, means including a motor and drive shaft for rotating said wheel, said wheel being quick-disconnected onto said shaft;

a foil tape having a heat and pressure transferable material thereon, said tape being in a cartridge mounted in said assembly such that said transferable material extends between a workpiece on said work surface and a character on a finger of said character wheel at a debossment zone;

means for individually heating said character on said wheel only in the immediate vicinity of said character; and

pressure means operable for exerting pressure on said finger, said heated character and said transferable material to simultaneously transfer said material from said foil tape to said workpiece and to deboss said material representative of said character onto said workpiece on said work surface; and

a keyboard and control unit for controlling debossment of a straight line of individual character debossments across said workpiece; for controlling relative movement of said workpiece and said assembly line-by-line; for controlling movement of said character wheel with respect to said pressure means; and for controlling movement of said pressure means to deboss said material from said tape.

4,930,912
APPARATUS FOR MOVABLY SUPPORTING AN OBJECT TO BE MARKED

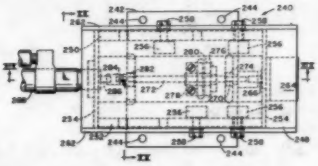
Edwin W. Speicher, Pittsburgh, Pa., assignor to M. E. Cunningham Company, Ingomar, Pa.

Continuation of Ser. No. 142,639, Jan. 11, 1988, Pat. No. 4,815,468, which is a continuation of Ser. No. 947,034, Dec. 29, 1986, abandoned, which is a division of Ser. No. 793,797, Nov. 1, 1985, Pat. No. 4,652,156, which is a division of Ser. No. 642,129, Aug. 17, 1984, Pat. No. 4,591,279. This application Jan. 12, 1989, Ser. No. 296,504

The portion of the term of this patent subsequent to May 27, 2003, has been disclaimed.

Int. Cl.[5] B41J *3/10*

U.S. Cl. 400—48 **15 Claims**



1. Apparatus for movably supporting an object to be marked comprising,

a fixed member having a horizontal surface,

a table assembly movably positioned on said fixed member for linear reciprocatory movement relative thereto,

an object to be marked being secured on the upper surface of said table assembly,

a generally U-shaped support member for supporting a marking device, said support member having an intermediate plate portion, a base plate portion, and a support plate portion, said base plate portion and said support plate portion extending from said intermediate plate portion in generally parallel spaced relation to each other,

said marking device having a longitudinal axis,

guide means secured to said support member between said base plate portion and said support plate portion, said guide means supporting said marking device for linear movement relative to said support member and having a longitudinal axis,

means pivotally mounting said marking device on said guide means,

first drive means for moving said marking device linearly relative to said fixed member to apply a mark on an object positioned beneath said marking device on said table assembly,

means for fixedly mounting said U-shaped support member adjacent to said table assembly with said base plate in a position either parallel to or perpendicular to said table assembly so that said marking device is arranged to mark either a vertical surface or a horizontal surface of said object to be marked, and

second drive means to move said table assembly relative to said fixed member to a position beneath said marking device so that said marking device can mark said object.

4,930,913
THERMAL PRINTING DEVICE AND TAPE SUPPLY CARTRIDGE THEREFOR

Peter A. Basile, Lawrenceville, N.J., assignor to Kroy Inc., Scottsdale, Ariz.

Continuation-in-part of Ser. No. 151,110, Feb. 1, 1988, Pat. No. 4,832,514. This application Jan. 19, 1989, Ser. No. 299,973

Int. Cl.[5] B41J *3/02, 35/28*

U.S. Cl. 400—120 **27 Claims**

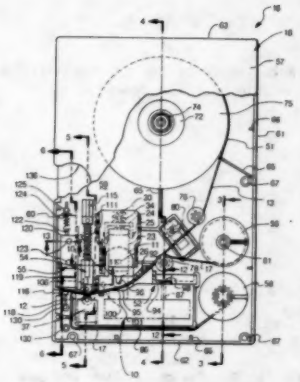
1. A tape supply cartridge for operative insertion into and used with a thermal printing device or the like having a print station for forming a selected image onto a tape and an elongated rotatably driven first tape advancement roller rotatably supported within said printing device and including a first generally cylindrical roller portion and a first drive member mounted to said first roller for rotation therewith, said cartridge comprising:

a cartridge housing having top and bottom walls and an edge wall joining said top and bottom walls;

a supply of tape for receiving a printed image;

guide and alignment means for guiding said tape into alignment with said print station; and

an elongated second tape advancement roller disposed within said cartridge housing and having a second generally cylindrical roller portion and a second drive member mounted to said second roller for rotation therewith, said second roller rotatably mounted within a portion of said cartridge and said second drive member adapted for operative engagement with said first drive member, the longitudinal axis of said second roller portion being generally parallel to the longitudinal axis of said first roller portion, said tape being disposed between said first and second roller portions for engagement therewith and said first and second drive members being engaged with one another when said cartridge is operatively inserted into said device; and bias means for biasing said second tape advancement roller toward said first tape advancement roller.



4,930,914
APPARATUS FOR MAKING TACTILE IMPRESSIONS ON PAPER

Harold D. Hulterstrum, and Thomas R. Luck, both of Baraboo, Wis., assignors to K Enterprises, Inc., Plover, Wis.

Filed Apr. 11, 1988, Ser. No. 180,149

Int. Cl.[5] B41J *3/32*

U.S. Cl. 400—122 **19 Claims**

1. An apparatus for making tactile impressions on paper comprising, in combination:

a housing

means for advancing paper along a line of motion in said housing,

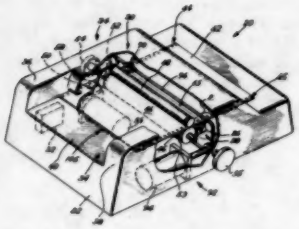
a plurality of pins in said housing;

means in said housing for guiding said pins toward and away from said paper;

a driver for selectively extending said pins toward said paper; and

platen means rotatably translated across said paper for pressing said paper and said pins in close contact, said platen

means comprising a first platen rotatable about an axis and moveable transversely with respect to the line of motion



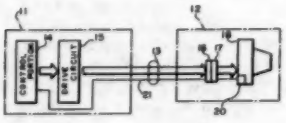
across the paper, whereby said selectively extended pins leave a tactile impression on said paper.

4,930,915

PRINTER HAVING MEANS FOR IDENTIFYING PRINT HEAD TYPE

Hiroshi Kikuchi; Jiro Tanuma; Hideaki Ishimizu, and Tadashi Kasai, all of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Jan. 6, 1988, Ser. No. 141,221
Claims priority, application Japan, Jan. 7, 1987, 62-541
Int. Cl.[5] B41J *3/12*
U.S. Cl. 400—175 **4 Claims**



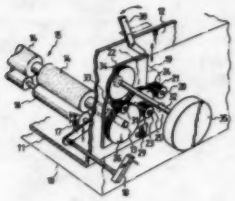
1. A printer comprising:
a print head having a print head connector;
a carriage having disposed thereon a carriage connector means for detachable connecting said print head via said print head connector;
a driver means for driving said print head;
a microprocessor means for controlling said driver means in accordance with an N-bit print head identification signal, wherein N is a positive integer;
a plurality of signal lines for connecting said microprocessor means to said carriage connector means; and,
a parallel-to-serial converter means, disposed on said print head, for converting N parallel inputs into said N-bit print head identification signal, and for outputting said N-bit print head identification signal when said print head connector is connected to said carriage connector means, wherein said N-bit print head identification signal is transmitted to said microprocessor means via at least one of said plurality of signal lines;
wherein said N-bit print head identification signal is indicative of a type of said print head.

4,930,916

PAPER FEEDER

Shinsuke Fujiwara, Osaka, Japan, assignor to NEC Home Electronics Ltd., Osaka, Japan

Filed Nov. 30, 1988, Ser. No. 277,866
Claims priority, application Japan, Nov. 30, 1987, 62-302917
Int. Cl.[5] B41J *13/02*
U.S. Cl. 400—636 **5 Claims**



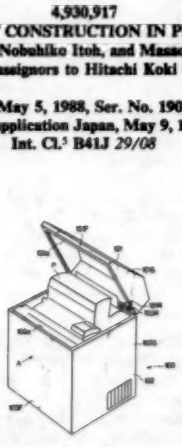
1. A paper feeder comprising:
a frame;
a motor mounted on said frame for generating a driving force;
a deceleration gear train mounted on said frame;
means mounted on said frame for transferring said driving force from said motor to said deceleration gear train;
a paper feeding roller;
a paper feeding roller shaft mounting said roller for transferring said driving force from said deceleration gear train to said paper feeding roller;
a plate supported on said paper feeding roller shaft so as to be freely rotatable about an axis thereof, the rotation of said plate in a first direction permitting engagement of said paper feeder roller with said deceleration gear train and rotation of said plate in a second direction permitting disengagement of said paper feeder roller and said deceleration gear train;
means for manually rotating said paper feeding roller shaft when said paper feeding roller is disengaged from said deceleration gear train.

4,930,917

SOUNDPROOF CONSTRUCTION IN PRINTER BOX

Shinichi Watahiki; Nobuhiko Itoh, and Masao Miyasaka, all of Katsuta, Japan, assignors to Hitachi Koki Co., Ltd., Tokyo, Japan

Filed May 5, 1988, Ser. No. 190,351
Claims priority, application Japan, May 9, 1987, 62-69184[U]
Int. Cl.[5] B41J *29/08*
U.S. Cl. 400—690 **12 Claims**



1. A sound reducing construction for shielding sound in a confined box, said box including a first plate component formed with a first open end portion and a second plate component formed with a second open end portion and accommo-

dating therein a machine which generates said sound, said first plate component being movable with respect to said second plate component, comprising:

at least one packing unit having one end fixed to said first open end portion of said first component and having another end portion in contact with said second open end portion when said first component is rested on said second component; and

each of said first and second open end portions comprising first and second generally horizontal walls interconnected by a generally vertical wall for providing stepped portions in conformance with each other, said stepped portions defining therebetween two horizontally extending gaps interconnected by a vertically extending gap, said at least one packing unit being positioned in at least one of said horizontally extending gaps.

4,930,918

OFFICE MACHINE, IN PARTICULAR MATRIX PRINTER

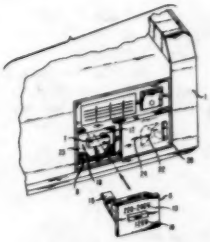
Erich Steppe, Ulm, and Dieter Beth, Elchingen, both of Fed. Rep. of Germany, assignors to Mannesmann Aktiengesellschaft, Düsseldorf, Fed. Rep. of Germany

Filed Sep. 19, 1988, Ser. No. 246,077

Claims priority, application European Pat. Off., Oct. 16, 1987, 87730131.7

Int. Cl.[5] B41J *29/00*

U.S. Cl. 400—719 **19 Claims**



1. An office machine comprising an electrical or, respectively, electronic circuit;

a multiple safety fuse socket for at least two melting safety fuse bodies and disposed on an electrical input side of the office machine and connected in series to a power grid;

a power supply for providing current power of the electrical circuit and including a fuse on the input side toward the power grid;

a voltage selection switch actuatable by insertion of the the multiple safety fuse socket for at least two melting safety fuse bodies, wherein the multiple safety fuse socket is insertable in different positions relative to the voltage selection switch and wherein a selected voltage at the voltage selection switch is coordinated to each position of the multiple safety fuse socket;

a cover which cover alternatingly depending upon shifting direction will cover a power receptacle of the office machine or the multiple safety fuse socket.

4,930,919

APPLICATOR UNIT INCLUDING DEVICE FOR COMPACTING THE PRODUCT ON THE APPLICATOR

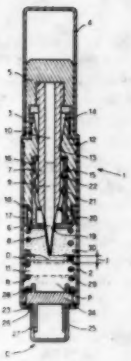
Jean-Louis Gueret, Paris, France, assignor to L'Oreal, Paris, France

Filed Aug. 31, 1988, Ser. No. 238,426

Claims priority, application France, Aug. 31, 1987, 87 12073

Int. Cl.[5] A45D *40/00, 40/10*

U.S. Cl. 401—126 **10 Claims**



1. An applicator unit for applying a powder or paste product comprising:

a bottle for containing the product, said bottle having proximal and distal ends, said proximal end having an opening defined therethrough and a neck defined about said opening;

a cap element for engaging said neck to close said opening;

a stem having a proximal end and a distal end, said proximal end of said stem being coupled to said cap so that said stem is disposed within said bottle when said cap closes said opening;

an applicator defined on the distal end of said stem;

means defined at said distal end of said bottle for compacting the product around the applicator, said compacting means having a rest position and an actuated position wherein the product is compacted around the applicator, said compacting means being actuatable by a user of the unit to move said compacting means from said rest position to said actuated position; and

elastic means for restoring the compacting means to said rest position following actuation by the user;

said compacting means comprising a piston slidably mounted in the distal end of the bottle, said piston being joined to a push button projecting beyond the distal end of the bottle.

4,930,920

COMBINED MATERIAL APPLICATOR AND GINGIVAL TISSUE RETRACTOR FOR MAKING DENTAL IMPRESSIONS

Simon Fitzig, Tel Aviv, and David Feder, Kfar Saba, both of Israel, assignors to Raniot University Authority of Applied Research & Industrial Development Ltd., Tel-Aviv, Israel

Filed Aug. 9, 1988, Ser. No. 229,953

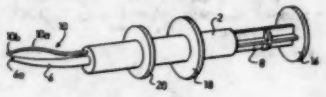
Claims priority, application Israel, Aug. 10, 1987, 83489

Int. Cl.[5] B67D *5/00*; A61C *9/00*

U.S. Cl. 401—176 **13 Claims**

1. An applicator particularly useful in making a dental impression of a tooth, comprising: a barrel for containing a dental impression material; an ejector nozzle fixed to the barrel at one end thereof through which the dental impression material is to be ejected; a plunger movable through the opposite end of the

barrel for ejecting the dental impression material through the ejector nozzle; and a retractor at said one end of the barrel adjacent to the tip of said ejector nozzle and including an arm secured to said one end of the barrel and terminating in a



substantially spherical tip located adjacent to the tip of the ejector nozzle and engageable with the gingival tissue at the tooth whose impression is to be made for retracting the gingival tissue at the time the dental impression material is ejected.

4,930,921

TUBULAR WRITTING PEN WITH SUPERPOSED PRESSURE EQUALIZATION CHAMBERS

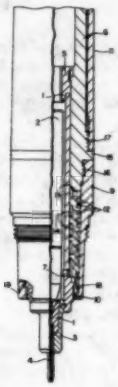
Gerold Anderka, Ellerbek, Fed. Rep. of Germany, assignor to Koh-I-Noor Rapidograph, Inc., Bloomsbury, N.J.

Continuation of Ser. No. 834,514, Feb. 28, 1986, abandoned, which is a continuation of Ser. No. 529,654, Sep. 16, 1983, abandoned, which is a continuation of Ser. No. 236,411, Feb. 20, 1981, abandoned. This application Dec. 22, 1988, Ser. No. 287,602

Claims priority, application Fed. Rep. of Germany, Mar. 10, 1980, 3009100; Mar. 10, 1980, 3009169; Mar. 10, 1980, 8006529[U]

Int. Cl.[5] B43K *8/00, 5/18*

U.S. Cl. 401—258 **9 Claims**



1. In a tubular writing pen of the type having a soft plastic writing fluid reservoir cartridge (6) with a front end which is adapted to be pushed from the rear and forwardly onto the outer surface of a hard plastic cylindrical body (1) which has an inner bore to communicate ink from said reservoir cartridge to a writing capillary tube carried at the front end of said cylindrical body (1), the improvement which comprises a front wall region on said reservoir cartridge (6) that is configured to cooperate with said cylindrical body (1) and a surrounding cylindrical sleeve (9) so as to define an equalizing chamber means comprised of axially extending, interconnected helical passages, that is replaced with replacement of said reservoir cartridge, said equalizing chamber means further comprising an outer equalization chamber (12) and an inner equalization chamber (14), wherein the outer equalization chamber (12) further comprises outwardly open channels defined within an outer surface of said cartridge front wall region that are adapted to be covered by a smooth inner surface portion of a surrounding cylindrical sleeve (9), to define a first axially extending helical passage, said outer equalization chamber further having a rear end that terminates proximate to a connecting bore (13) that extends transversely through said front wall region in order to interconnect with said inner equalization chamber and a front end that communicates with surrounding air through an aperture defined between a front end of the cylindrical sleeve (9) and a portion of the outer surface of said cylindrical body (1), wherein further said inner equalizing chamber 14 comprises inwardly open channels defined within an inner surface of said reservoir cartridge front wall region, that are adapted to be covered by a smooth outer surface portion of said cylindrical body (1) to define a second axially extending helical passage, said inner equalization chamber further having a rear end which communicates with said connecting bore (13) and a front end that communicates with said cylindrical body inner bore through a transverse bore (7), means to mount said cylindrical sleeve (9) from the front and rearwardly into a surrounding relationship to the soft plastic reservoir cartridge front wall region, so as to cause a first sealing engagement between an inner surface of said sleeve and an outer surface of said reservoir cartridge and a second sealing engagement between a soft plastic inner equalization chamber front end and a hard plastic cylindrical body annular shoulder (18) proximate the front end of the cylindrical body (1), said cylindrical sleeve mounting means further comprising a reservoir cartridge intermediate wall region, posterior to the outer equalization chamber (12), which comprises an outer surface defined with a first external thread (16), and said cylindrical sleeve (9) has a first internal thread proximate its the rear end of said cylindrical sleeve (9) that is adapted to engage with said first external thread (16), whereby said cylindrical sleeve is adapted to surround and cover said reservoir cartridge front wall region, and axially urge the hard plastic cylindrical body annular shoulder (18) against the soft plastic inner equalization chamber front end upon an axial engagement of said cylindrical sleeve first internal thread rearwardly onto the first external thread (16) of the reservoir cartridge.

4,930,922

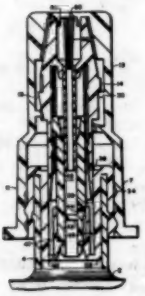
COATING APPLICATOR WITH ROTATABLE FLOW CONTROL

Joseph P. LaRosa, 7 Cherokee Dr., Danbury, Conn. 06811, and Gina Pisa, 665 Warren Ave., Thornwood, N.Y. 10594

Filed Jun. 22, 1989, Ser. No. 369,963

Int. Cl.[5] A45D *34/00*

U.S. Cl. 401—281 **10 Claims**



1. A liquid applicator which comprises a resiliently deformable container having an open neck, adapted to hold a liquid; a closure support having at least one opening therethrough, means to sealingly engage the container neck and at least one thread engaging means on an outer surface; a brush holder mounted on the closure support, carrying a brush with a pas-

sage for the liquid, the brush extending above the closure support, the brush holder having a conduit means for carrying liquid to the brush; a variable flow resistance liquid flow passage means, to aid in controlling the liquid flow between the liquid in the container and the brush; sleeve means between the container and the brush, having cap engaging means, disposed about the brush holder and displaceable between a first position where the brush is exposed for use and a second position where the sleeve means surrounds the brush; a cap means having thread means engageable with the thread engaging means on the closure support and means for engaging the cap engaging means on the sleeve means to move the sleeve means from the first position to the second position as the cap is rotated in engagement with the thread engaging means on the closure support, the cap means engages the sleeve means, when the sleeve means is in the second position, to seal the brush in the environment of the inside of the container to prevent the brush from drying out.

4,930,923

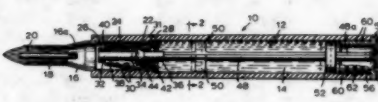
COSMETIC APPLICATOR

Charles Reichmann, Kew Gardens, and Bhupinder S. Kalsi, Plainview, both of N.Y., assignors to DRI Mark Products, Inc., Port Washington, N.Y.

Continuation of Ser. No. 25,568, Mar. 13, 1987, abandoned, which is a continuation-in-part of Ser. No. 897,599, Aug. 18, 1986, abandoned. This application Nov. 9, 1988, Ser. No. 274,723

Int. Cl.[5] A46B *11/00, 11/04*

U.S. Cl. 401—278 **7 Claims**



1. An instrument for applying a fluid cosmetic to the surface of the skin of a user comprising a tubular holder defining a reservoir for retaining a supply of the fluid cosmetic, an applicator removably mounted in the front end of said holder and an end wall closing the rear end of said holder, a valve dividing said reservoir into a primary chamber at the rear of said holder and a secondary chamber at the front of said holder, said valve being normally biased in a closed position to occlude the flow of fluid cosmetic from said primary chamber to said secondary chamber and means extending rearwardly through said primary chamber for moving said valve from its normally closed position to permit flow of liquid media from said primary chamber, said valve including a hollow perforated body surrounding said valve and forming an intermediate chamber by which said liquid media is inhibited in its flow into said secondary chamber, said applicator comprising a body formed of fluid transmitting material having a forward tip end for applying the fluid to the skin of the user and a rear end for contact with the fluid in the secondary chamber, a hollow impervious tube inserted within said body having its front end spaced from the tip end of said body and its rear end extending outwardly from the rear end of said body and an impervious sleeve surrounding said body substantially along its length to secure said body and tube into a cohesive unit, said sleeve of said applicator having an outer surface of a diameter conforming to that of the inner diameter of the front end of said holder said sleeve being removably insertable in said front end of said holder to close the front end of said secondary chamber and space said hollow impervious tube from and out of contact with said valve, at least one of the outer surfaces of said sleeve and the inner surface of the front end of said holder having formed thereon grooves extending from end to end between said holder and said sleeve providing vents for passage of air to and from said secondary chamber.

4,930,924

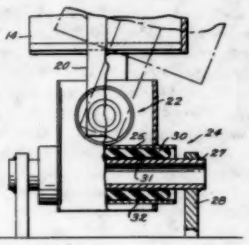
LOW WEAR ARTICULATED BUOY

Edwin S. Hunt, Arlington, Va., assignor to DEI Enterprises, McLean, Va.

Filed Feb. 3, 1989, Ser. No. 305,822

Int. Cl.[5] F16B *1/00*

U.S. Cl. 403—24 **15 Claims**



1. A low wear articulated buoy comprising, a buoy column, a sinker and a joint comprising:

a. a first bushing having an inner shaft member, an outer hollow cylindrical member surrounding the inner shaft, an elastomeric material disposed between the inner shaft and the outer member, wherein, when the inner shaft is rotated with respect to the outer member, the elastomeric material can accommodate the relative motion in shear;

b. a second bushing having an inner shaft member, an outer hollow cylindrical member surrounding the inner shaft, an elastomeric material disposed between the inner shaft and the outer member wherein, when the inner shaft is rotated with respect to the outer member, the elastomeric material can accommodate the relative motion in shear;

c. means for fixedly attaching the outer member of the first bushing to the outer member of the second bushing, wherein the first bushing is disposed at an angle of 90° with respect to the second bushing;

d. means for fixedly attaching the shaft member of the first bushing to said sinker; and

e. means for fixedly attaching the shaft of the second bushing to said buoy column.

4,930,925

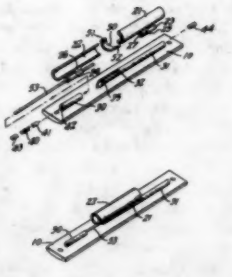
LOOSE-LEAF NOTEBOOK CONSTRUCTION

Judith A. M. Baldwin, New York, and Stephen Selwyn, Brooklyn, both of N.Y., assignors to Strategic Financial Communications Corp., New York, N.Y.

Filed Mar. 28, 1989, Ser. No. 329,655

Int. Cl.[5] B42F *13/22*

U.S. Cl. 402—30 **5 Claims**



1. In a notebook construction having cover and a selectively

openable and closeable binder mechanism for supporting a plurality of pre-punched loose-leaf pages, the improvement in which said binder mechanism includes:

(a) an elongated rigid plate means;

(b) a hollow tubular support channel means including upper and lower portions fixed to said plate means in coaxial relation with one another;

(c) an opposed pair of pivotable clam shell means cooperatively associated to define a closed, generally elongated cylindrical, leaf holder in a first radial position and an open split cylinder in a second radial position;

(d) said clam shell means including a rod-like pivot means slidably mounted in said support channel for limited axial displacement between a first normally restrained position and a second normally unrestrained position;

(e) first spring means axially biasing said pivot means toward said first normally restrained position;

(f) second spring means radially biasing said clam-shell means apart toward said open position; and

(g) camming means associated with said support channel means and operative to cam said clam shell means into said closed position.

4,930,926

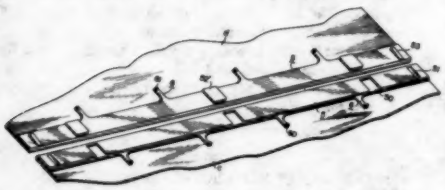
BINDER FOR REMOVABLE LEAVES

Roan Kwang-Wen, 3F., No. 59, Ta Chu Street, Taipei, Taiwan

Filed Jul. 20, 1988, Ser. No. 221,754

Int. Cl.[5] B42F *13/18*

U.S. Cl. 402—55 **4 Claims**



1. A strip-shaped binder comprising a scarfing section having an obverse side and a reverse side, said obverse side of said scarfing section having one or more dovetail sliding grooves and one or more slantingly-shaped sandwiching grooves, one or more dovetail sliding blocks disposed on said reverse side of said scarfing section directly opposite said dovetail sliding grooves, one or more slantingly-shaped sandwiching blocks disposed on said reverse side of said scarfing section directly opposite said slantingly-shaped sandwiching grooves, one or more clamping sections protruding from said scarfing section, each of said clamping sections having a groove disposed on one side, convex tenons and a convex block disposed, on a side opposite said groove, on each of said clamping sections, said dovetail sliding blocks and said slantingly-shaped sandwiching blocks being engageable with corresponding dovetail sliding grooves and slantingly-shaped sandwiching grooves of an adjacent binder, such that adjacent binders may be attached together, said convex blocks being engageable with said groove and said convex tenons such that leaves having punched holes may be held in place by the connection of said convex blocks with said groove and said convex tenons.

4,930,927

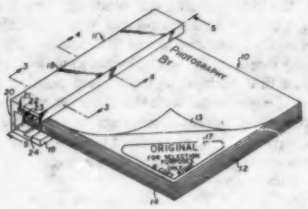
TAMPER-PROOF BINDER FOR PHOTOGRAPHS AND THE LIKE

Maurice R. Dumas, 620-A St., Waller, Tex. 77484

Filed Feb. 15, 1989, Ser. No. 310,695

Int. Cl.[5] B42F *13/14*

U.S. Cl. 402—63 **19 Claims**



1. A tamper-proof binder for securing together a plurality of sheets having apertures along one side thereof comprising;

a longitudinal generally rectangular spine member having a back wall, a longitudinal open side opposite the back wall, a top wall having a plurality of first fastener elements extending from the underside thereof, a bottom wall having a plurality of second fastener elements extending from the topside thereof in axial alignment with said first fastener elements, and

one of said axially aligned pairs of said fastener elements having opposed shank portions adapted to be inserted through aligned apertures in a stack of sheets which have apertures along one side edge, said opposed shank portions having cooperative gripping surfaces thereon which will engage one another in a substantially permanent relation when pressed together axially to provide a very high resistance to disassembly once pressed together.

4,930,928

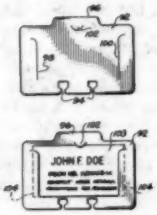
INDEX CARD FOR INDEX CARD FILE

John Ristuccia, Sr., 453 E. Susan La., Tempe, Ariz. 85281

Continuation of Ser. No. 77,383, Jul. 24, 1987, Pat. No. 4,849,056. This application Jan. 4, 1989, Ser. No. 293,378

Int. Cl.[5] B42F *19/00*

U.S. Cl. 402—79 **9 Claims**



1. An index card for displaying a business card having a predetermined height and width and including a top edge, a bottom edge, and a pair of parallel, spaced apart side edges, said index card comprising:

(a) at least a first major portion having a top edge, a bottom edge, and a pair of spaced apart side edges; and

(b) slot means formed in said first major portion for receiving at least two edges of the business card to removably secure the business card to said first major portion, said slot means including

(i) stop means for supporting the bottom edge of the business card, and

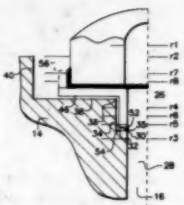
(ii) opposed centering means for bearing against the opposite side edges of said business card to center said card in said first major portion.

4,930,929

GLASS TUBE/STAINLESS STEEL HEADER INTERFACE FOR PRESSURE SENSOR

Rastko C. Maglic, Colorado Springs, Colo., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Sep. 26, 1989, Ser. No. 412,962
Int. Cl.[5] F16B 1/00
U.S. Cl. 403—29 5 Claims



1. A mounting assembly for indirectly mounting a glass tube having an end to a metallic header, said mounting assembly comprising:

said metallic header having a bore, said bore having a first shoulder and a second shoulder, said second shoulder axially displaced from said first shoulder;

a first annular surface extending radially outwardly from said first shoulder;

a second annular surface extending radially outwardly from said second shoulder;

said bore further having a sidewall, said sidewall having a radius, said sidewall connecting said first annular surface with said second annular surface;

an interface comprising a radially outwardly extending portion and an axially extending portion, said radially outwardly extending portion having a top surface and a bottom surface, said axially extending portion having a first end, a second end, an inside radius and an outside radius with said outside radius being smaller than said radius of said bore sidewall; with said first end integrally connected to said bottom surface of said radially outwardly extending portion;

said end of said glass tube attached to said top surface of said radially outwardly extending portion of said interface;

said interface received in said bore with said bottom surface of said radially outwardly extending portion adjacent said first annular surface, and said outside radius of said axially extending portion spaced from said sidewall of said bore, with said second end of said axially extending portion located adjacent said first annular surface; and

means for securing said interface to said header only at the junction of said inside radius of said second end of said axially extending portion with said first shoulder to allow substantially stress free expansion of said interface to reduce the likelihood of the breakage of said glass tube.

4,930,930

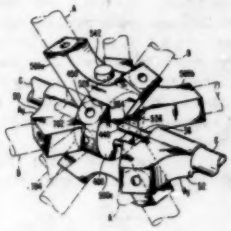
TRUSS BEAM ATTACHMENT APPARATUS

Anthony P. Coppa, Merion Station, Pa., assignor to General Electric Company, King of Prussia, Pa.

Filed Dec. 21, 1988, Ser. No. 287,201
Int. Cl.[5] F16B 1/00; E04H 12/00
U.S. Cl. 403—171 15 Claims

1. An apparatus adapted for rigidly attaching a first truss beam of the type having a multilateral cross-section to a second truss beam oriented at a non-zero angle relative to said first truss beam, each of said beams being constructed of a plurality of triangular frame elements, each of said frame elements comprising first, second, and third multiple struts interconnected by means of first, second, and third vertex fittings disposed at first, second, and third vertices respectively of said frame element, a said first vertex fitting of one of said frame elements being connected to a said second vertex fitting of another frame element and a said third vertex fitting of still another frame element, said apparatus comprising:

a first rabbet member having first and second opposed surfaces and a plurality of side surfaces extending therebetween, a first and a second one of said side surfaces each



adapted for connection to a different one of said first, second and third struts and facing in a direction generally opposite to the direction of a third one of said side surfaces;

a generally slab-like connector member having first and second substantially parallel opposed surfaces and including multiple connecting means for connecting multiple objects thereto; and

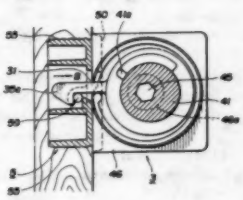
means associated with said third side surface and with one of said multiple connecting means for attaching said rabbet member to said connector member to form an attachment device, said attachment device adapted to replace one of said vertex fittings.

4,930,931

INSTRUMENT FOR ASSEMBLING BOARD-SHAPED BODIES

Kazuhiro Matsui, Aichi, Japan, assignor to Kabushiki Kaisha Kojima Shohten, Tokyo, Japan

Filed Jan. 6, 1989, Ser. No. 294,763
Claims priority, application Japan, Feb. 4, 1988, 63-024487
Int. Cl.[5] B25G 3/00; F16B 9/00
U.S. Cl. 403—231 8 Claims



1. An instrument for assembling two board-shaped bodies, comprising:

an engagement tool adapted to be driven into a part of one board-shaped body, said engagement tool having

an engagement member comprising an annular portion and an engagement portion projecting radially out-

wardly from an outer peripheral surface of said annular portion and provided at the tip thereof with an engagement pawl,

a rotary member rotatably fitted within said annular portion and adapted to rotate relative thereto to thereby move said engagement member in an engagement direction, and

a case accommodating said engagement member and said rotary member, said case having means to regulate the rotation of said rotary member to a predetermined angle and also having a slip-off preventing stepped grooves formed on the outer periphery thereof for engagement with said one board-shaped body;

a fixing tool adapted to be driven into a part of the other board-shaped body, said fixing tool having an insertion hole into which said engagement portion is inserted, and an engagement pin with which said engagement pawl of said engagement member engages by the rotation of said rotary member, said fixing tool having on the outer periphery thereof a member and stepped grooves for engagement with said other board-shaped body for prevention of slip-off; and

stop means coating between said case and said engagement member for limiting relative rotation therebetween.

4,930,932

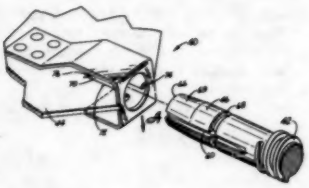
QUICK RELEASE ATTACHMENT MECHANISM

Bruce A. LaVahn, New Brighton, Minn., assignor to Minnesota Scientific, Inc., West St. Paul, Minn.

Filed Mar. 29, 1989, Ser. No. 330,420

Int. Cl.[5] B25G *3/18*

U.S. Cl. 403—325 **16 Claims**



1. A quick release connection mechanism for connection of a surgical retraction assembly comprising:

an elongated coupling shaft having a lead end supported by the retraction assembly;

a latch catch disposed on the coupling shaft spaced from the lead end of the shaft;

longitudinally extending grooves along opposite sides of the shaft;

a flattened portion of a surgical retraction tool;

a slot in the flattened portion of the tool to receive the coupling shaft, the slot having facing parallel edges forming sides of the slot, for engaging the grooves along opposite sides of the shaft; and

a latching flange disposed across and substantially perpendicular to the slot;

an aperture through the latching flange sized to admit the coupling shaft, the aperture having a latch engaging portion, and

a spring biasing the flange toward a position where the latch engaging portion cooperates with the latch catch to disengagedly lock the position of the coupling shaft when the coupling shaft is positioned sufficiently far enough through the latch flange aperture.

4,930,933

HAND TOOL, ESPECIALLY A GARDENING, FARM, CLEANING, OR LIKE IMPLEMENT

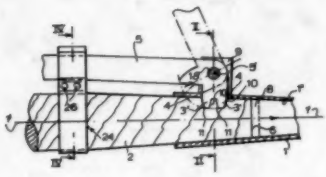
Max Langenstein, Dietenheim, Fed. Rep. of Germany, assignor to Max Langenstein Feld- und Gartengerate GmbH & Co., Illertissen, Fed. Rep. of Germany

Filed Jun. 30, 1988, Ser. No. 213,580

Claims priority, application Fed. Rep. of Germany, Jul. 4, 1987, 3722219

Int. Cl.[5] B25G *3/18*; F16B *2/02*; F16D *1/06*

U.S. Cl. 403—330 **27 Claims**



1. In a hand tool comprising a tool shaft received in an attaching socket of a working implement and a clamping device mounted exteriorly on said attaching socket with a clamping piece which engages said tool shaft through an opening in a wall of said attaching socket with said clamping device in a closed condition, the improvement wherein said clamping piece is mounted on a clamping lever which is pivotally mounted exteriorly on said attaching socket pivotable about one pivot axis extending substantially perpendicularly to the longitudinal axis of said socket, said clamping lever being substantially longer than said clamping piece from said pivot axis, said clamping piece together with said clamping lever forming a bent lever, said clamping lever being swung inwardly in said closed condition of said clamping device against said tool shaft and being swung away in the open condition of said clamping device sufficiently far from said tool shaft that said clamping piece is out of engagement with said tool shaft and on closing said clamping device the front end of said tool shaft is braced by said clamping piece axially against a stop formed by said attaching socket, said attaching socket having two trunnion lugs projecting substantially radially from said attaching socket spaced parallel from each other, between which said clamping lever is mounted with said clamping piece and said opening, said opening being provided in said wall of said attaching socket, in which said clamping piece in pivoting comes into contact to fit at least at said front end of said tool shaft in the axial direction, a groove being hollowed out of said tool shaft for the portion of said clamping piece engageable in said tool shaft, said groove running like a ring around the circumference of said tool shaft.

4,930,934

SURFACE, SUBSURFACE, CONTINUOUS FEED MOISTURE MAINTENANCE SYSTEM APPARATUS AND METHOD

Donald E. Adkins, P.O. Box 217, San Simon, Ariz. 85632

Filed May 11, 1988, Ser. No. 193,266

Int. Cl.[5] E02B *11/00*

U.S. Cl. 405—37 **9 Claims**

1. A moisture maintenance system for microscopic irrigation, said moisture maintenance system comprising:

(a) a preset flow rate valve means for regulating water volume into said maintenance system according to water needs of plants being watered, said valve means being adapted with inlet and outlet ports for connecting to a first length of water distribution tubing from a water source and to an inlet end of a second length of water distribution tubing, respectively, said water source having a main

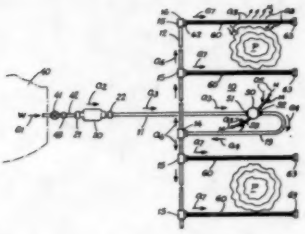
shut-off valve, said preset flow rate valve means comprising:

at least one emitter means for maintaining a continuous microscopic flow of water at a specified constant rate, within a specified range of inlet water pressures, and

a housing means for encapsulating said at least one emitter means and for containing said provided water flow from said emitter means to be distributed to said moisture maintenance system,

said at least one emitter means being a housed emitter means within said housing means,

said at least one housed emitter means includes an inlet port and a plurality of outlet ports, each outlet port being designed to provide a preset flow rate, said plurality of outlet ports being provided having a closed orifice and being selectively opened to provide



a preset water volume determined by the number of opened outlet ports;

(b) a moisture actuated sensor valve, said moisture actuated sensor valve having an inlet port for being connected to an outlet end of said second length of water distribution tubing and an outlet port for connecting to an inlet end of a third length of water distribution tubing;

(c) a water distribution manifold, said manifold having a main inlet port and a plurality of parallel water distribution ports and at least one terminating end, said main inlet port being connected to an outlet end of said third length of water distribution tubing; and

(d) a plurality of permeating, moisture distribution tubes, each one of said plurality of moisture distribution tubes having an inlet end connected to a selected water distribution port member of said plurality of parallel water distribution ports and a closed terminating end.

4,930,935

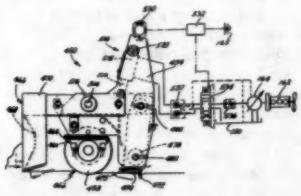
SCREEDING APPARATUS AND METHOD

Philip J. Quenzi, Atlantic Mine, Mich.; David W. Somero, Wheeler Rd., and Paul J. Somero, both of New Ipswich, N.H. 03071, assignors to David W. Somero

Filed Dec. 29, 1988, Ser. No. 291,678

Int. Cl.[5] E01C *19/40*

U.S. Cl. 404—75 **62 Claims**



1. An improved screeding apparatus for loose or plastic materials such as placed and/or poured, uncured concrete previously placed on the ground or another support surface, said apparatus being of the type including a support for supporting said apparatus on the ground or a support surface, a boom extending outwardly from said support, boom support means for mounting said boom on said support, a screed assembly, and screed mounting means for mounting said screed assembly on said boom, the improvement comprising:

said screed assembly being elongated and including a striker for engaging and spreading the material, rotatable auger means for moving the material along the direction of elongation of said screed assembly, and vibration means for engaging, vibrating and smoothing the material, said striker and vibration means being spaced on opposite sides of said auger means;

articulated means for pivotally mounting said screed assembly on a first pivot axis extending generally parallel to the direction of elongation of said screed assembly, said pivot axis being positioned generally in vertical alignment with said auger means;

motive power means for pivoting said screed assembly about said pivot axis whereby contact of said striker and vibration means with the material may be varied and adjusted.

51. A method of screeding material such as placed and/or poured, uncured concrete with a screed assembly comprising:

providing a screed assembly having a striker for engaging and spreading the material, means for moving the material in a lateral direction across the path of travel of said screed assembly, and vibration means for engaging, vibrating and smoothing the material;

moving the screed assembly through the material in a predetermined direction to spread, grade and smooth the material;

pivoting the striker, means for moving the material and vibration means of the screed assembly in unison about an axis perpendicular to said predetermined direction during such movement to counteract the force of the material acting on said screed assembly and to maintain effective screeding contact of said screed assembly with the material during such movement.

4,930,936

PARTIAL-SEEPAGE DRAINAGE PIPE WITH MATING SLEEVE

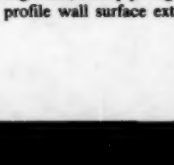
Wilhelm Hegler, Goethestrasse 2, D-8730 Bad Kissingen, and Ralph-Peter Hegler, Bad Kissingen, both of Fed. Rep. of Germany, assignors to Wilhelm Hegler, Bad Kissingen, Fed. Rep. of Germany

Filed Feb. 6, 1984, Ser. No. 577,260

Claims priority, application Fed. Rep. of Germany, Apr. 12, 1983, 3313147

Int. Cl.[5] F16L *31/00*; E02B *11/00*

U.S. Cl. 405—49 **14 Claims**



1. A partial-seepage drainage pipe comprising a plurality of similarly shaped pipe segments, each pipe segment including a corrugated, circular profile wall surface extending over the

majority of the circumference of said segment, and a base having a bottom surface and side wall portions, each pipe segment further including a mating sleeve molded thereon at one end for receiving the free end of another pipe segment, each pipe segment having slit-like water seepage openings disposed in the corrugated wall surface, said pipe segments each comprising:

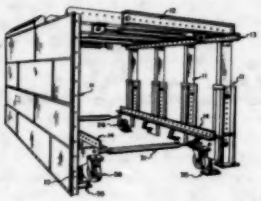
the bottom surface being slightly convexly arched, and the thickness of the bottom surface being three to five times the thickness of said circular profile wall surface.

4,930,937

BOX CULVERT TRAVELER FOR USE WITH CONCRETE FORMING SYSTEMS

William R. Fulton, San Antonio, Tex., assignor to Symons Corporation, Des Plaines, Ill.

Filed Jul. 26, 1988, Ser. No. 224,543
Int. Cl.[5] B28B 7/30; E21D 10/04, 11/10; B60B 33/06
U.S. Cl. 405—149 14 Claims



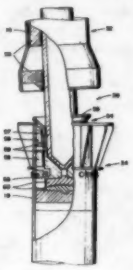
1. In a traveling culvert/tunnel forming structure including upright waler assemblies positioned in rows in the transversely spaced relation on each side of said forming structure, the waler assemblies being adapted to receive forms on outside surfaces thereof, horizontally adjustable header assemblies supported at opposite ends by said spaced upright waler assemblies, collapsible braces secured between the upright waler assemblies enabling the upright wlaer assemblies to move towards and away from one another, the improvement of multi purpose mounting brackets mounted on said rows of said uprignt waler assemblies and extending inwardly from the waler assemblies to mounting brackets being arranged in rows, rows of casters swivelly mounted on said brackets inside of said rows of upright waler assemblies beneath said header assemblies, and a pair of rows of traveling leveling jacks for elevating the forming structure and its casters out-of-contact with a ground supporting surface, the traveling leveling jacks each having an upstanding jack shaft, threads on said shaft in threaded retaining engagement with one of said brackets in traveling assembly therewith, said shafts being located between said upright waler assemblies and said casters, the leveling jacks being at all times carried on said brackets in assembly with the forming structure, means on said jacks enabling said jacks to be vertically adjustable for positioning the upright waler assemblies in predetermined adjusted above ground relation to one another, said mounting brackets each having a pair of vertically spaced generally parallel flanges secured therewith and with said flanges having vertically aligned upper and lower openings, each of said jacks being positioned beneath an associated pair of said flanges and with its jack shaft projecting upwardly through said lower opening and having its upper jack shaft end positioned beneath said second opening for receipt of a wrench for adjustment of the jack position by rotation of said jack shaft, a pair of longitudinally extended reinforcing members disposed in transversely spaced relation interiorly of said forming structure with each reinforcing member being mounted on an uppermost one of said flanges along the associated row of brackets, and means securing said reinforcing members to said uppermost flange in the associated rows.

4,930,938

OFFSHORE PLATFORM DECK/JACKET MATING SYSTEM AND METHOD

Philip J. M. Rawstron, and Francis D'Abrera, both of Surrey, England, assignors to Exxon Production Research Company, Houston, Tex.

Filed Jun. 2, 1989, Ser. No. 360,827
Int. Cl.[5] E02B 17/04
U.S. Cl. 405—204 29 Claims



1. A system for mating a preconstructed integrated deck transported by a barge with a previously installed offshore platform jacket, said integrated deck being positioned generally above said jacket, said integrated deck and said jacket having a plurality of deck/jacket leg pairs each of which consists of a downwardly extending leg attached to said integrated deck and a corresponding upwardly extending leg attached to said jacket, said mating system comprising:

(a) means for lowering said integrated deck onto said jacket;

(b) a primary load transfer unit installed in at least two of said deck/jacket leg pairs, each said primary load transfer unit comprising

(1) an alignment portion installed in one of said legs of said deck/jacket leg pair, said alignment portion having an extendable alignment probe attached thereto by a primary compression spring means and

(2) a receptacle portion installed in the other of said legs of said deck/jacket leg pair, said receptacle portion having a stabbing cone mounted on a large diameter spherical bearing adapted to permit said stabbing cone to move laterally across the surface of said bearing, said stabbing cone adapted to receive said extendable alignment probe portion as said deck is lowered onto said jacket;

(c) a secondary load transfer unit installed in at least a third one of said deck/jacket leg pairs, said secondary load transfer unit comprising

(1) an engagement portion installed in one of said legs of said deck/jacket leg pair, said engagement portion having a bearing shoe attached thereto by a secondary compression spring means and

(2) a receptacle portion installed in the other of said legs of said deck/jacket leg pair, said receptacle portion adapted to receive said bearing shoe as said deck is lowered onto said jacket,

said secondary load transfer unit adapted to engage after said primary load transfer unit has engaged and said first compression spring means has been compressed a distance so as to transfer a portion of the weight of said integrated deck to said jacket; and

(d) means for disengaging said integrated deck from said barge.

4,930,939

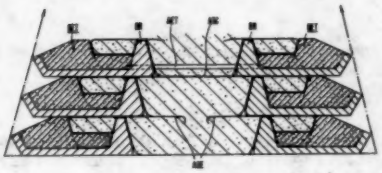
WALL WITH GRAVITY SUPPORT STRUCTURE, BUILDING ELEMENT AND METHOD FOR CONSTRUCTION THEREOF

Felix P. Jaecklin, Geissbergstr. 46, CH-5400 Ennetbaden, Switzerland

Continuation-in-part of Ser. No. 904,643, Sep. 8, 1986, Pat. No. 4,818,150. This application Jan. 25, 1989, Ser. No. 301,386

Int. Cl.[5] E02D *29/02, 17/20*

U.S. Cl. 405—262 **11 Claims**



1. A wall, particularly constructed as a slope-supporting wall, comprising a support structure with a plurality of compartments, each compartment being at least partially defined by flexible sheet material that extends along layers of bulk material, the wall further comprising at least one forepart, said forepart including a rear side adjacent said support structure, said rear side including at least one supporting element projecting at an angle, particularly transversely, in relation to the direction in which said flexible sheet material extends along said layers of bulk material, said rear side further including at least one space neighboring said supporting element and being arranged at least partially offset in relation to said supporting element in a direction towards a front side of said forepart, at least a part of said flexible sheet material extending from said support structure into said space and over said projecting element so as to form a positive connection with said forepart.

4,930,940

SYSTEM FOR GUIDING THE EXCAVATION TOOL USED FOR CONSTRUCTING A WALL CAST IN THE GROUND

Jacques Charlier, Ivry-sur-Seine; Paul Dupeuble, Noisy-le-Grand, and Jean-Claude Gessay, Roissy-en-Brie, all of France, assignors to Sondages Injections Forages "S.I.F." Enterprise Bachy, France

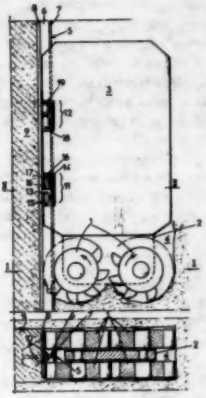
Filed Mar. 10, 1989, Ser. No. 321,316

Claims priority, application France, Mar. 18, 1988, 88 03534

Int. Cl.[5] E02D *5/18, 29/00*

U.S. Cl. 405—267 **5 Claims**

1. A system for guiding an excavation tool used for making trenches necessary for the construction of a wall cast in the ground by means of successive or alternate panels, comprising a vertical guide member extending over the height of the trench to be made and fixed to a previously constructed adjacent wall panel or to a formwork installed at an end of the previously constructed adjacent panel, and guide wheels carried by the excavation tool and rolling on said guide member, said guide member and said guide wheels being shaped and arranged in such a way that said wheels are retained by said guide member counter to any horizontal force tending to separate said wheels from said guide member, and



said wheels are profiled so as to destroy any obstacle of hardened concrete or slurry, possibly present on said guide member, as said wheels roll on said guide member.

4,930,941

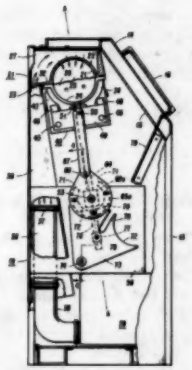
CUSTOMER TERMINAL FOR A SINGLE TUBE PNEUMATIC SYSTEM FOR BANKING AND THE LIKE

Clair L. Willey, Marion, and David H. Ayer, Cedar Rapids, both of Iowa, assignors to Inter Innovation LeFebure Mfg. Corp., Cedar Rapids, Iowa

Filed Nov. 21, 1988, Ser. No. 274,308

Int. Cl.[5] B65G *51/26*

U.S. Cl. 406—10 **9 Claims**



1. In a customer terminal for a single tube pneumatic system for banking or the like in which a cylindrical carrier is transmitted between the customer terminal and a teller terminal through an interconnecting carrier transit tube, the carrier having annular sealing means adjacent each end for pneumatically sealing the carrier with respect to the transmit tube, the customer terminal including a two-piece carrier receiver for receipt and dispatch of the carrier, the receiver having a fixed upper portion constituting a carrier housing and a movable lower portion constituting a carrier tray for supporting the

carrier, the carrier housing and tray having partial cylindrical walls together defining an interior cylindrical carrier chamber within the receiver when the carrier housing and tray are in a closed portion forming the carrier receiver, the carrier housing and tray having mating edge portions when in their closed position, and means effective to open and close the carrier receiver, the improvement wherein said means opens the receiver by moving the carrier tray downwardly in a first plane through the axis of said chamber and thence upwards in a second plane inclined with respect to the first plane so that the carrier tray is disposed laterally to one side of the carrier housing in a position presenting a carrier in the tray to a customer, said means closing the receiver by moving the carrier tray downwardly in the second plane and then upwardly in the first plane, the carrier tray remaining longitudinally parallel to the carrier housing throughout said movements.

4,930,942

METHOD OF DISPOSAL OF ARTICLES BY FLUSHING

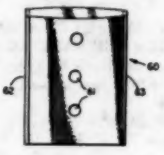
Denis E. Keyes, Staten Island, and Marvin S. Aronoff, New York, both of N.Y., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Division of Ser. No. 161,077, Feb. 26, 1988, which is a division of Ser. No. 944,891, Dec. 23, 1986, Pat. No. 4,762,738. This application Oct. 11, 1988, Ser. No. 256,355

The portion of the term of this patent subsequent to Aug. 9, 2005, has been disclaimed.

Int. Cl.[5] B65G *53/00*

U.S. Cl. 406—49 6 Claims



1. The method of disposing of a soft, flexible article which comprises wrapping or enclosing said article within a material that becomes slimy or exudes a slimy material when in contact with the water in a toilet bowl, placing said wrapped or enclosed article into a toilet bowl, and flushing whereby said article passes from said bowl through the trap into the waste line.

4,930,943

SILO FOR STORING AND DISCHARGING BULK MATERIAL AND METHOD OF OPERATING SUCH SILO

Norbert Ahrens, Oelde; Wolfgang Kluger, Beckum; Joachim-Rudolf Mihatsch, Warstein-Allagen, and Hans-Jürgen Rzadki, Ahlen, all of Fed. Rep. of Germany, assignors to Krupp Polysius AG, Fed. Rep. of Germany

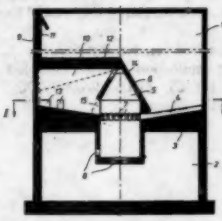
Filed Dec. 5, 1988, Ser. No. 279,504

Claims priority, application Fed. Rep. of Germany, Dec. 22, 1987, 3743637

Int. Cl.[5] B65G *69/08*

U.S. Cl. 406—90 8 Claims

1. A silo for storing and discharging bulk material comprising a material storage chamber having a base, a material discharge chamber positioned centrally of said base and extending therethrough, discharge openings in said discharge chamber for the discharge of material below said base, delivery openings in said discharge chamber peripherally thereof and above said base for delivery of material from said storage chamber into said discharge chamber, and a combination material delivery and discharge chamber venting channel extending from said discharge chamber across a limited peripheral sector of said base, said channel being in communication with both said storage and discharge chambers, whereby peripherally uniformed delivery of material from said storage chamber to said



discharge chamber is accomplished with simultaneous venting of said discharge chamber.

4,930,944

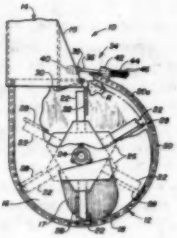
BLOWER WITH ENERGY ABSORBING HOUSING

Robert M. VanGinhoven, Lancaster, Pa., assignor to Ford New Holland, Inc., New Holland, Pa.

Filed Jan. 23, 1989, Ser. No. 300,513

Int. Cl.[5] A01D *87/10*

U.S. Cl. 406—97 6 Claims



1. In a blower for conveying material including a housing formed of a front wall, a rear wall, and a side wall extending between said front and rear walls, a plurality of arms extending radially from a central shaft for rotation within said housing, paddles mounted on said arms and disposed in close proximity to the inner surfaces of said front, rear and side walls, the improvement comprising:

means urging a portion of said side wall into a normal position but permitting said side wall portion to be flexed outwardly if a foreign object impacts against the inside of said side wall portion with sufficient force to overcome said urging means.

4,930,945

INSERT ROTARY CUTTER

Tatsuo Arai, Kitamoto; Takayoshi Saito, Tokyo; Osamu Tsujimura, and Hiroaki Hayashizaki, both of Kawasaki, all of Japan, assignors to Mitsubishi Metal Corporation, Tokyo, Japan

Filed May 16, 1989, Ser. No. 352,249

Claims priority, application Japan, May 20, 1988, 63-123356; Jun. 17, 1988, 63-149338; Jan. 13, 1989, 1-3072[U]

Int. Cl.[5] B26D *1/12*; B23P *15/28*

U.S. Cl. 407—40 18 Claims

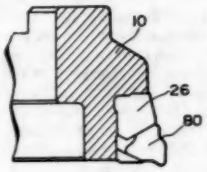
14. An insert rotary cutter further comprising:

(a) a cutter body having an axis of rotation therethrough and having a forward end face; and

(b) a plurality of first cutter inserts releasably attached to

said cutter body, each said first cutter insert being of a generally triangular shape including a front face having three marginal ridges and three corner ridges where adjacent marginal ridges intersect each other, each marginal ridge being comprised of first, second and third ridge portions disposed so that the second ridge portion is interposed between the first and third ridge portions, said first insert having three main cutting edges each defined by a respective first ridge portion, three auxiliary cutting edges each defined by a respective third ridge portion, three corner cutting edges each defined by a respective corner ridge, and three relief cutting edges each defined by a respective second ridge portion;

one of said corner cutting edges and the main and auxiliary cutting edges which intersect said one corner cutting edge being indexed in active cutting position, in such a manner that said indexed main cutting edge extends generally axially from said body while said indexed auxiliary cutting edge extends slightly beyond said forward end face, the relief cutting edge which intersects said indexed auxiliary cutting edge being displaced rearwardly with respect to said body from said indexed auxiliary cutting edge;



at least one wiper insert replacing some of said first cutter inserts said wiper insert including a front face having three marginal ridges and three corner ridges where adjacent marginal ridges intersect each other, each marginal ridge of said wiper insert being comprised of first and second ridge portions, said wiper insert having three main cutter edges each defined by a respective first ridge portion, three wiper cutting edges each defined by a respective second ridge portion, and three corner cutting edges each defined by a respective corner ridge, one of said corner cutting edges of said wiper insert and the main and wiper cutting edges which intersect said one corner cutting edge being indexed in active cutting portion, in such a manner that said indexed main cutting edge extends generally axially from said body while said indexed wiper cutting edge extends slightly beyond said forward end face; and

a plurality of support members of an identical shape and size, said first and wiper inserts being received by respective said support members, said first and wiper inserts being dimensioned such that the indexed wiper cutting edge of said wiper insert is longer than the indexed auxiliary cutting edge of said first insert and is spaced forwardly from said body a distance therefrom.

4,930,946

CHAMFERING REAMER WITH TRIP SHOULDER

Douglas B. Phillips, Sr., 4124 Greenleaf, Spring, Tex. 77389

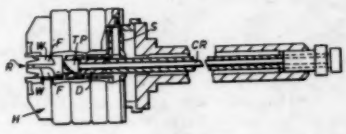
Filed Oct. 19, 1988, Ser. No. 259,893
Int. Cl.[5] B23B *5/16*
U.S. Cl. 408—80 **23 Claims**

9. A reaming tool for simultaneously reaming the inside and outside diameters at the end of a pipe or conduit comprising;

a generally cylindrical body having a truncated conical forward end to be received within the inside diameter of a pipe or conduit and a rearward end adapted to be secured in a tool holder and a plurality of longitudinal flutes extending rearwardly from the forward end defining a plurality of circumferentially spaced longitudinal wings,

each said wing having a tapered front portion extending rearward and outward at an angle relative to the longitudinal axis to form a generally conical reaming portion having a maximum diameter smaller than the outer diameter of said wings but sufficiently large enough to ream the interior diameter at the end of the pipe or conduit received thereon,

each said wing having a generally conical shoulder portion extending rearward and outward from the conical reaming portion to the outer surface of said wing at a greater angle relative to the longitudinal axis than said conical reaming portion to provide angular clearance between the end surface of the pipe or conduit being reamed, and



a hollow cylindrical sleeve having a central bore slidably received and removably secured on said body and a plurality of forwardly extending projections in radial alignment with said wings,

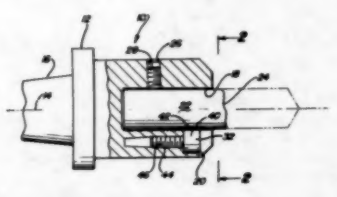
each said projection having a tapered front portion extending rearward and inward at an angle relative to the longitudinal axis to form a generally flat reaming surface in opposed angular relation to said conical reaming portion of said body to receive and ream the outer diameter at the end of the pipe or conduit as said conical reaming portion reams the interior diameter.

4,930,947

TOOL HOLDER

Mark Jacobson, Davisburg, Mich., assignor to M.L.S. Detroit, Inc., Troy, Mich.

Filed May 30, 1989, Ser. No. 354,868
Int. Cl.[5] B23B *31/04*
U.S. Cl. 408—153 **7 Claims**



1. A tool holder comprising:

a body having an axis and adapted to be rotatably driven about said axis,

said body having an axial bore in one end adapted to receive the shank of a cutting tool,

said body having a threaded radial bore which intersects said axial bore,

a threaded fastener in said radial bore which, upon tightening, abuts against the cutting tool shank to secure said cutting tool to said body,

a pair of alignment members, each member having a surface substantially tangent to said axial bore, said members being on opposite sides of a plane axially bisecting both the axial bore and the radial bore and on the opposite side from the radial bore of a second plane axially bisecting the axial bore and perpendicular to the axis of the radial bore,

wherein each alignment member is shaped so that the radial distance between said alignment surface on the alignment member and said axis varies in dependence upon the posi-

tion of the alignment member with respect to the body, said alignment members comprising in addition at least one cam rotatably mounted to said body about an axis parallel to and radially spaced from said axial bore in said body, said cam having a cam surface which forms said alignment member surface,

means for independently adjusting the position of each alignment member.

4,930,948

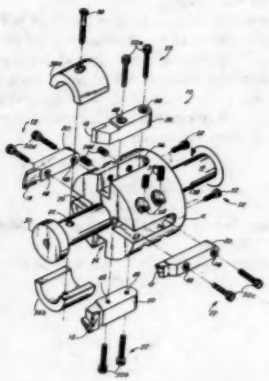
VALVE SEAT REFITTING APPARATUS

William H. Bowen, 4311 Bayou Blvd., Pensacola, Fla. 32503

Continuation of Ser. No. 214,763, Jul. 5, 1988, abandoned. This application Aug. 29, 1989, Ser. No. 399,857

Int. Cl.[5] B23B *51/00*

U.S. Cl. 408—190 **16 Claims**



1. A valve seat refitting apparatus, comprising:

(a) a main body portion having an elongated longitudinal bore therethrough;

(b) a centering guide provided in said bore and rigidly attached to said main body portion;

(c) a plurality of cutting blades attached to said main body portion; and,

(d) means for adjusting the longitudinal and radial position of said cutting blades on said main body portion, said means for adjusting the position of said cutting blades comprising:

i. said main body portion having a plurality of longitudinal slots provided therein and around its outer periphery;

ii. a cutting blade support attached to each of said cutting blades and adapted to be received by said longitudinal slots;

iii. a plurality of sets of adjusting screws provided for radial and longitudinal adjustment of the position of said cutting blades, a first set of said adjusting screws received by and through said cutting blade supports and a second set of said adjusting screws received longitudinally by and through said main body portion for engaging one end of said cutting blade supports; and,

iv. a plurality of set screws for locking said cutting blade supports in position.

4,930,949

THREAD MILLING CUTTER

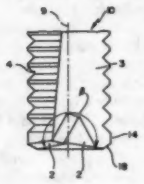
Josef Giessler, Zell-Harmersbach, Fed. Rep. of Germany, assignor to Prototyp-Werke GmbH Fabrik für Präzisionswerkzeuge, Zell-Harmersbach, Fed. Rep. of Germany

Filed Feb. 28, 1989, Ser. No. 316,818

Claims priority, application Fed. Rep. of Germany, Mar. 16, 1988, 3808797

Int. Cl.[5] B23G *5/20*

U.S. Cl. 408—222 **9 Claims**



1. A thread milling cutter comprising an elongated shank, the tip of which comprises at least two cutting edges for forming a bore, which enclose together an end face angle and which are each separated by a chip groove, the cutter comprising at its outer side between the chip grooves respectively at least one toothed thread milling cutting edge provided with cutting studs, wherein said two cutting edges for forming a bore are formed as a pair of face milling cutting edges and wherein said end face angle (β) for forming a hollow tip is greater than 180°, the face milling cutting edges inclined inwardly back from the tip.

4,930,950

APPARATUS FOR ADJUSTING THE DRUMS OF A BEVEL-GEAR CUTTING MACHINE

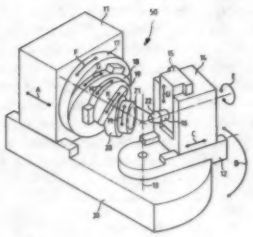
Hermann Stadtfeld, Dielsdorf, Switzerland, assignor to Werkzeugmaschinenfabrik Oerlikon-Bührle, Zürich, Switzerland

Filed Jul. 28, 1989, Ser. No. 386,458

Claims priority, application Switzerland, Aug. 16, 1988, 03076/88

Int. Cl.[5] B23F *9/00*

U.S. Cl. 409—27 **4 Claims**



1. An apparatus for adjusting the drums of a bevel-gear cutting machine, comprising:

a generating stock;

said generating stock containing a motor-driven generating drum and a plurality of setting drums;

each setting drum being adjustable to a predetermined setting position;

means for clamping a setting drum at a setting drum adjacent thereto in said predetermined setting position;

means for reading said predetermined setting position of each setting drum;

a cutter head rotatably mounted in said plurality of setting drums;

a gear train for driving said cutter head;

computer means for controlling the adjustment of said plurality of setting drums;

locking means controllable by said computer means;

said locking means serving to lock at said cutter head one setting drum of said plurality of setting drums;

said means for reading said predetermined setting position of each setting drum constituting automatic position-reading means for transmitting to said computer means the positions of said plurality of setting drums;

actuating means controllable by said computer means; and

said actuating means serving to actuate said means for clamping a setting drum at a setting drum adjacent thereto in said predetermined setting position.

4,930,951

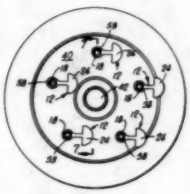
TORQUE VERIFICATION APPARATUS AND METHOD

Mark A. Gilliam, Lutz, Fla., assignor to Tube, Inc., Edmond, Okla.

Filed Aug. 22, 1988, Ser. No. 234,853

Int. Cl.[5] F16B *31/02*

U.S. Cl. 411—14 **19 Claims**



1. Torque verification apparatus for use in connection with a fastener of the type comprising a threaded nut and a bolt having a threaded body portion and a head portion, said threaded body portion having a central axis, and for verifying that an amount of torque applied to the nut is equal to or greater than a predetermined torque value, comprising:

a member having an opening therein for receiving the threaded body portion of the bolt and a peripheral surface surrounding said opening, said opening having a perimeter large enough to receive the threaded body portion of the bolt but smaller than the outside perimeter of the nut whereby said peripheral surface will be clamped between the head portion of the bolt and the nut when the nut is tightened onto the threaded body portion of the bolt, said peripheral surface having a thickness and area, and being formed of an extrudable material of the type, so that when an amount of torque applied to the nut equals or exceeds said predetermined toque value, said peripheral surface will be sufficiently extruded completely from between the head of the bolt and the nut to allow it to be pulled over the nut in a substantially axial direction with respect to the threaded body portion of the bolt without breaking, but when an amount of torque applied to the nut is less than the predetermined torque value, said peripheral surface will not be sufficiently extruded completely from between the head of the bolt and the nut to allow it to be pulled over the nut in a substantially axial direction with respect to the threaded body portion of the bolt without breaking; and

a handle attached to said peripheral surface for allowing said peripheral surface to be pulled outwardly from the nut in a substantially axial direction with respect to the threaded body portion of the bolt, said handle comprising an elongated extension arm portion attached to and extending outwardly and unidirectionally from said peripheral surface and finger grip means attached to said extension arm portion.

4,930,952

GLASSES FRAME CARRIER FOR A REPRODUCING MACHINE

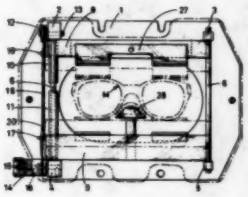
Michel J. M. Lecerf, La Saussaye, and Raynald M. G. Longuet, Le Gros Theil, both of France, assignors to Briot International, Elbeuf, France

Filed Apr. 11, 1989, Ser. No. 336,240

Claims priority, application France, Apr. 14, 1988, 88 04931

Int. Cl.[5] B23Q *35/46*

U.S. Cl. 409—130 **8 Claims**



1. Glasses frame carrier for a reproducing machine, which carrier comprises a base plate including four supports located at corners of a rectangle, two parallel strips each slidably mounted on two of said supports, said strips being relatively movable selectively toward and away from each other, and means for centering and supporting a glasses frame between said two parallel strips, said strips being respectively fixed to means comprising a cable having opposed parallel portions and to which portions said strips are each fixed, two spaced-apart pulleys each rotatably connected to said supports, said cable forming a loop around said pulleys, one of said pulleys constituting cable-driving means and one of said pulleys including braking means.

4,930,953

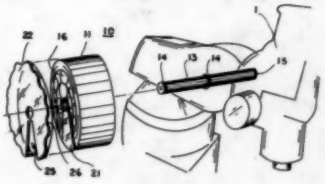
ENCLOSED DRUM COLLET STORAGE SYSTEM

Steven P. Fischer, 17408 W. Elmwood Rd., New Berlin, Wis. 53146

Filed Nov. 6, 1989, Ser. No. 431,841

Int. Cl.[5] B23Q *13/00*

U.S. Cl. 409—134 **12 Claims**



1. A storage system for milling machine collets, including:

a cylindrical drum having front and rear faces and a central axial passageway;

an elongated shaft having two opposite ends, one end disposed through said central passageway of said drum and the other of said ends mounted through the conventional pivot pin mount of a milling machine, thereby mounting said drum to the milling machine;

a plurality of bored recesses arcuately disposed about said front face of said drum, said recesses being for holding individual collets;

a cover mounted over said drum face to cover said collets from debris.

4,930,954

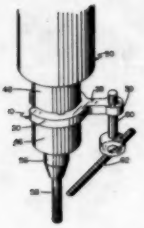
HOLDING DEVICE FOR MILLING MACHINES

Elwood D. Dague, 2239 S. Mead, Wichita, Kans. 67211

Filed May 18, 1989, Ser. No. 353,481

Int. Cl.[5] B23C 9/00

U.S. Cl. 409—136 4 Claims



1. An accessory item holder for use with milling machines, said holder comprising a C-shaped body of resilient material defining an opening having an internal wall bounding said opening that is generally conformable to more than 180 degrees of the circular extent of a right circular cylinder, said opening having an entrance of a width that is from about 30% to about 70% of the diameter of the opening, said body having an axial thickness of from about 15% to about 30% of the diameter of the opening, and the body having a radial extent about the opening of about 15% to about 35% of the diameter of the opening, and said body having an integral radially extending support arm at a position that is spaced angularly from the entrance, said arm being provided adjacent its extremity with an aperture therethrough that is adapted to accept therethrough shanks of accessory items.

4,930,955

APPARATUS AND METHOD FOR CLAMPING A WORK PIECE FOR MACHINING THEREOF

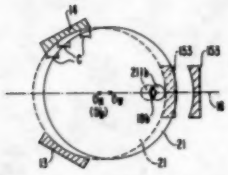
Satoshi Kawano, Tamamura; Yoshio Kimura, Maebashi, and Eiji Fukushima, Fujimi, all of Japan, assignors to Sanden Corporation, Japan

Filed Feb. 28, 1989, Ser. No. 316,099

Claims priority, application Japan, Feb. 29, 1988, 63-44495

Int. Cl.[5] B23Q 3/00

U.S. Cl. 409—225 18 Claims



1. A chuck for clamping a discoid portion of a work piece, said chuck having a center and including a base, at least two fixed clamps secured on a front end surface of said base, a movable clamp having a center, adjacent to said front end surface and movable toward said two fixed clamps, and a pin secured to said front end surface of said base and adapted to fit within a hole formed in said discoid when said discoid is mounted on said chuck, the improvement comprising:

said pin being positioned radially inwardly of said movable clamp on an axis between the center of said movable clamp and the chuck center and oriented so that said two fixed clamps are equiangularly spaced from said axis and equidistantly spaced from said pin.

4,930,956

DEVICE FOR MAKING A MECHANICAL ELEMENT INTEGRAL IN ROTATIONAL MOVEMENT WITH A SECOND EXTERNAL, COAXIAL ELEMENT BY FRICTION

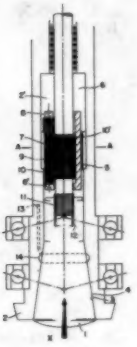
Elis Mantovani, Breganzona, Switzerland, assignor to Tecnodelta S.A., Bioggio, Switzerland

Filed Feb. 3, 1989, Ser. No. 307,129

Claims priority, application Switzerland, Dec. 20, 1988, 4685/88

Int. Cl.[5] B23C 5/26

U.S. Cl. 409—233 3 Claims



1. A coaxial shaft and housing assembly adapted to be locked against relative rotation, comprising a housing (2) having a threaded internal cylindrical surface (5) of a first pitch (m); a coaxial shaft (10) received in said housing (2) and having an intermediate threaded external portion (10') of said first pitch (m), said intermediate threaded external portion (10') being spaced from said threaded internal cylindrical surface (5); a plurality of stud pins (7) having axes substantially parallel to the axis of shaft (10), said stud pins (7) having external threading of said first pitch (m) and being in meshing engagement with both said intermediate threaded external portion (10') and said threaded internal cylindrical surface (5), said stud pins (7) being freely rotatably mounted in a carriage (9) disposed for axial translation within said housing (2) along said shaft (10); and an arbor (1) fitted in one end of said housing (2); said shaft (10) further comprising an end (11) having external threading of a second pitch (n), said arbor (1) comprising a socket (12) having internal threading of said second pitch (n), and said housing (2) and said arbor (1) having cooperating tapered surfaces adapted to promote a progressively increasing frictional engagement upon axial insertion of said arbor (1) into said housing (2); whereby screwing of said threaded end (11) into said threaded socket (12) causes said arbor (1) to approach axially said housing (2) while causing said stud pins (7) to rotate about their axes in meshing engagement with both said intermediate threaded external portion (10') and said threaded internal cylindrical surface (5), thereby causing axial translation of said plurality of stud pins (7) and associated carriage (9) within said housing (2), and whereby, upon contact of said cooperating tapered surfaces of said housing (2) and said arbor (1), further screwing of said shaft (10) into said socket (12)

causes, due to the difference between said first and second pitches (m and n), an axial traction on said arbor (1) into said housing (2) and thus a desired contact pressure between said cooperating tapered surfaces (3, 4).

4,930,957

CENTERING SYSTEM FOR ROTARY MACHINE ELEMENTS, PARTICULARLY BORING, MILLING, REAMING TOOLS AND THE LIKE

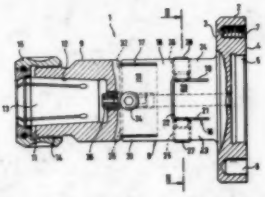
Alfred Priessnitz, Esslingen, Fed. Rep. of Germany, assignor to Eberhard Bauer GmbH & Co., Neckar, Fed. Rep. of Germany

Filed Aug. 3, 1989, Ser. No. 388,997

Claims priority, application Fed. Rep. of Germany, Jul. 19, 1988, 3824462

Int. Cl.[5] B23B *31/08*

U.S. Cl. 409—234 **20 Claims**



1. Centering system for rotary machine elements and for coupling a driving portion (2) rotatable about a given axis to a driven portion (9), wherein said driven portion is rotatable about a driven axis,

said system providing for adjustment between the driving and the driven portion to ensure congruence of said driven axis with said given axis, and having

a coupling element (8) connecting the driving portion (2) and the driven portion (9);

wherein the coupling element comprises

two first spring elements (23, 24) located on one (2) of said portions (2, 9) and coupled to the other (9) of said portion;

said two first spring elements extending essentially parallel to the axis of rotation of said one portion (2) and being radially deflectable with respect to said axis;

first counter support means (29) located between said spring elements and coupled to one (20) of said portions; and

two first adjustable spring position adjustment means (25, 27; 26, 28) coupled to respective ones of said first spring elements (23, 29) and engaging said first counter support means (29) for setting the spring position of the respective first spring elements.

4,930,958

ROUND BALE CARRIER AND UNLOADER

Karl Palmer, R.D. #2, Box 50, Earlville, N.Y. 13332

Filed Feb. 8, 1989, Ser. No. 307,678

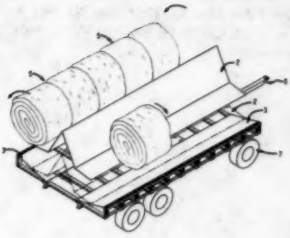
Int. Cl.[5] B60P *1/00*

U.S. Cl. 414—24.5 **5 Claims**

1. A round bale hauler and unloader comprising; a wagon frame having a central longitudinal axis; one or more axles secured to the frame; wheels rotatably attached to said one or more axles for support and movement;

an elevatable superstructure located along and parallel to the central longitudinal axis of the wagon frame and extending from the front to the rear of the wagon; and,

means for raising the superstructure above the wagon frame and for lowering the superstructure onto a portion of the wagon frame, said portion of the wagon frame comprising wedge shaped structures fixedly attached along both top side edges of the wagon frame sloping inward toward the center of the wagon which form, with the superstructure when it is lowered onto the wedge shaped structures, two parallel side by side channels, wherein the bales can be loaded into each of the two parallel channels with the bale axis parallel to the longitudinal axis of the wagon, and



unloaded by raising the superstructure above the wagon frame, thereby causing the bales to roll over the wedge shaped structures and off the sides of the wagon.

4,930,959

DEVICE FOR MOUNTING DOOR FRAMES, WINDOW FRAMES AND SIMILAR OBJECTS AT AN ADJUSTABLE DISTANCE FROM A SUPPORT STRUCTURE

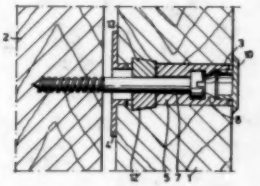
Kjell-inge G. Jagelid, Box 19, Veddige, Sweden S-430 20

Filed Jan. 13, 1989, Ser. No. 296,819

Claims priority, application Sweden, Jan. 13, 1988, 8800086

Int. Cl.[5] F16B *35/02, 39/00*

U.S. Cl. 411—107 **17 Claims**



1. A device for adjustably interconnecting an object and a support structure, comprising:

a tubular member for insertion into a hole in the object and having a central bore for receiving a screw therein;

a first end portion provided with means for rotatably locking the head of a screw against longitudinal movement in the bore;

a second end portion provided with abutment means extending radially of the tubular member for abutting against the surface of the object surrounding the hole in which the tubular member is received; and

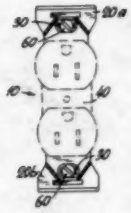
diametrically expandable engagement means on a portion of the tubular member adjacent the abutment means for engaging with the interior of the hole in the object, which engagement means is diametrically expandable by inserting a screw into the central bore of the tubular member.

4,930,960

MOUNTING ARRANGEMENT FOR ELECTRICAL WIRING DEVICES HAVING NON-METALLIC MOUNTING STRAP

Harald B. Jadatz, Deer Park, N.Y., assignor to Slater Electric Inc., Glen Cove, N.Y.

Filed May 13, 1988, Ser. No. 194,057
Int. Cl.[5] F16B *39/282*; H02G *3/08*
U.S. Cl. 411—188 **10 Claims**



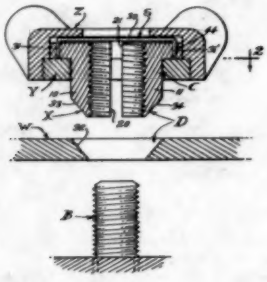
1. In an electrical wiring device comprising a device housing having non-metallic mounting straps with an aperture in each mounting strap for receiving a mounting screw to secure said device to an outlet box, wherein the improvement comprises a mounting screw at the aperture of each mounting strap for affixing said device to said outlet box, each said mounting screw comprising a head and a shank, said head having a topside and an underside wherein said underside of said head includes a lip and a series of ribs, said lip extending downward from the underside of said head and continuing along the perimeter of said head, said ribs protruding downwardly from the underside of said head between said screw shank and said lip, so that when said mounting screw is turned to the point where it abuts the non-metallic mounting strap, said lip and said ribs bite into said mounting strap to resist further turning.

4,930,961

QUICK LOCK AND RELEASE FASTENER

Charles W. Weis, 6 Sky Mountain Cir., Chico, Calif. 95928

Filed Dec. 23, 1988, Ser. No. 288,862
Int. Cl.[5] F16B *39/36*
U.S. Cl. 411—266 **24 Claims**



1. A quick lock and release fastener and workpiece for securing said workpiece to a threaded bolt, and including;

a split nut comprised of opposed semicircular members with opposed semicircular threads to threadedly engage the threaded bolt,

a drive plate with an opening therethrough to pass the split nut and exposing a bottom of the split nut for engagement with the workpiece,

a pilot and lock means at the bottom of the split nut guiding the semicircular members thereof into constrictive and locked threaded engagement with the bolt,

an operating head fixed to the drive plate and carrying the split nut in an assembly therewith,

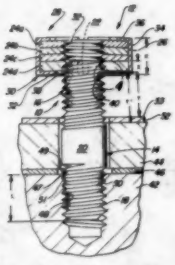
and cam means operable between the exterior of the split nut and the opening through the drive plate to alternately constrict the split nut into full threaded engagement with the bolt and to permit separation of the same therefrom, an incline on the exterior of the split nut, said incline continuing into a flat face complementary to and driven by a flat face of the opening through the drive plate.

4,930,962

NUT AND STUD ASSEMBLY

Richard L. Reynolds, Grosse Pointe Shores, Mich., assignor to Pac-Fasteners, an Affiliate of Peterson American Corp., Southfield, Mich.

Filed Dec. 1, 1988, Ser. No. 278,538
Int. Cl.[5] F16B *23/00, 35/00*
U.S. Cl. 411—366 **38 Claims**



1. A nut and stud assembly for securing workpieces together with at least one of the workpieces having a threaded bore comprising:

a stud member having a first threaded portion at one end,

a nut adapted to be threaded onto said first threaded portion,

said stud member having a second threaded portion at an opposite end from said one end and adapted to be threaded into the threaded workpiece bore,

first stop means between said nut and said first threaded portion and permitting initial movement of said nut on said first threaded portion up to a first preselected position and adapted to engage said nut to resist further threaded movement of said nut until a preselected first magnitude of torque between said nut and said stud has been attained,

said stud with said nut at said first preselected position functioning similarly as a headed bolt and adapted to have said second threaded portion threaded into said workpiece bore through the application of torque at a second magnitude of torque on said nut,

said second magnitude of torque being less than said first magnitude of torque,

second stop means being engageable for resisting movement of said second threaded portion in said workpiece bore when said second threaded portion has attained a preselected second position in said workpiece bore with the torque of such resisting movement being at a magnitude of torque greater than said first magnitude,

said first stop means responsive to a magnitude of torque on said nut greater than said first magnitude and less than said second magnitude for permitting further movement of said nut onto said first threaded portion beyond said first preselected position after said second stop means has been engaged with said nut being free running on that part of said first threaded portion beyond said first preselected position whereby the workpieces can be clamped together in the manner of a nut and separate stud combination, said nut comprising a plurality of conical spring disc washers and a cage,

said cage receiving and holding said disc washers in a stacked, aligned relationship to define a central opening threaded for threaded engagement on said first threaded

portion, said cage including a ring portion and a plurality of axially extending fingers cooperating with said ring portion to hold said disc washers in said stacked aligned relationship.

4,930,963

DRIVEN TUBULAR WALL-PLUG ANCHORING ELEMENT FOR LIGHT AND POROUS CONCRETE

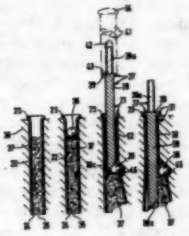
Gottfried Rockenfeller, and Uwe Rockenfeller, both of Hilchenbach, Fed. Rep. of Germany, assignors to Rockenfeller KG, Hilchenbach, Fed. Rep. of Germany

Filed Dec. 8, 1988, Ser. No. 281,834

Claims priority, application Fed. Rep. of Germany, May 17, 1988, 3816661

Int. Cl.[5] F16B *13/06*

U.S. Cl. 411—44 **15 Claims**



1. A tubular wall plug anchor assembly which can be inserted into gas-expanded concrete, light concrete, and the like material, comprising:

a hollow longitudinal sleeve having an initial constant inner diameter, said sleeve having an upper unslotted portion and a lower slotted portion, said lower slotted portion defined by a plurality of longitudinal slots extending upwards from an open end of said sleeve;

a head portion unitary with said sleeve, said head portion having a diameter greater than an outer diameter of said upper and lower portions;

a spreading body adapted to be driven into said sleeve, said body being a single sphere for flaring said legs in anchoring effect, said sphere being adapted to be inserted from said head portion of said sleeve into said unslotted portion thereof, and also advanced into said slotted portion; and

a driver, said driver having an end adapted to contact said spreading body and to drive said spreading body against any concrete material which has entered into said open end and into said unslotted portion of said sleeve, said end of said driver comprising an inclined wedge surface along and by which said single sphere at least in said slotted portion of said sleeve can be laterally displaced out of an initial position, which is co-incident with said central longitudinal axis, towards the respective sleeve walls away from said axis in a wedge-like movement.

4,930,964

HAY LOADER

John P. Doan, 213 Comanche, Tulia, Tex. 79088

Filed Dec. 27, 1988, Ser. No. 290,561

Int. Cl.[5] A01D *90/08, 87/12;* **B60P** *1/04;* **B65G** *67/02*

U.S. Cl. 414—24.5 **20 Claims**

15. The method of loading round hay bales upon a transport platform comprising:

a. pivoting a tilt platform to a transport platform,

b. pivoting wheel struts to the transport platform,

c. tilting the tilt platform to an upright position by moving the transport platform rearwardly,

d. also rotating the wheel struts upward by moving the transport platform rearwardly,

e. capturing the round bale onto the tilt platform,

f. raising and leveling the tilt platform with the round bale restrained thereon by moving the transport platform forward,

g. also rotating the wheel struts downward by moving the transport platform forward,

h. releasing the round bale from the tilt platform,

i. further tilting the tilt platform by further moving the transport platform forward until the tilt platform slopes toward the transport platform, and

j. rolling the round bale from the tilt platform onto the transport platform.

4,930,965

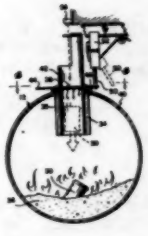
APPARATUS FOR CHARGING SOLID FUEL TO ROTARY KILNS

Charles D. Peterson, Ashdown, Ark.; James R. Tutt, Nash, Tex., and John Cody, Foreman, Ark., assignors to Cadence Chemical Resources, Inc., Michigan City and Ash Grove Cement Company, Overland Park, both of, Ind.

Filed Nov. 23, 1988, Ser. No. 275,788

Int. Cl.[5] F23K *3/00*

U.S. Cl. 414—149 **16 Claims**



1. An apparatus for charging a solid or containerized fuel comprising a combustible material through a wall of a rotating kiln cylinder containing a mineral material, said apparatus comprising:

a port in the wall of the kiln cylinder, a drop tube extending from the port and into the kiln cylinder a distance greater than the maximum depth of mineral material in the cylinder,

a closure for the port and means for actuating the closure between a port-opened position and a port-closed position at predetermined times during rotation of the kiln cylinder, said closure being sized relative to the port and positioned when in the port-closed position to allow clearance for air flow around the closure into the kiln;

means for receiving the fuel and positioning same for passage through the port, and

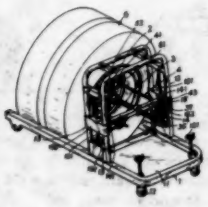
means for applying a force to said fuel sufficient to move said fuel from the receiving and positioning means through the port and drop tube and into the kiln cylinder.

4,930,966

TIRE DISMANTLING AND SETTING APPARATUS

Kuo-Feng Chien, P.O. Box 10160, Taipei, Taiwan

Filed Jun. 6, 1989, Ser. No. 362,264
Int. Cl.[5] B60B 31/06
U.S. Cl. 414—427 8 Claims



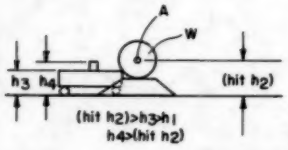
1. A tire dismantling and setting means comprising:
a roller holder for loading or holding tires thereon having rollers supporting said holder on a floor;
an axle retainer engageable with a shoulder inside an axle socket formed on an outer portion of a car axle;
a driving bolt rotatably engageable with said axle retainer having male threads formed on said bolt rotatably engageable with a female-threaded hole formed in a bracket of said holder; and
a pair of tire fasteners each fastener adjustably fastening a tire on said holder, whereby upon a clockwise rotation of said driving bolt to urge said bolt and said axle retainer rearwardly to force said axle retainer on the outer portion of the axle to retract said bracket of said bolt and said tire fasteners of said roller holder, the tires fastened by said fasteners will be conveniently dismantled to be held on said roller holder.

4,930,967

BOAT TRAILER SUPPORTING DEVICE

John J. Dovidauskas, 430 Lafayette St., Linden, N.J. 07036

Filed Jul. 18, 1989, Ser. No. 381,195
Int. Cl.[5] B65G 67/02
U.S. Cl. 414—373 4 Claims



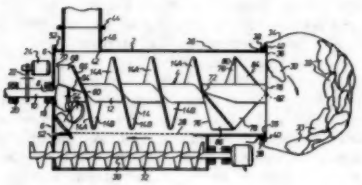
1. A support for a boat trailer, the boat trailer including a chassis, wheels connected together and to the chassis by an axle with the axle being located at a first height above a ground surface when the wheels rest on the ground, the support comprising:
(A) elevating means which lifts the wheels above the first height and includes two ramps each having an upwardly inclined entrance section, a downwardly inclined exit section and a horizontal top section connecting said entrance section to said exit section, each of said ramps having a bottom surface and a width which is measured between two sides of the ramp and which is sized to permit a trailer wheel to move onto and off of the ramp, said ramp top surfaces being spaced above the ramp bottoms to be located at a second height above the ground when said ramps are resting on the ground; and
(B) a movable dolly-like device which includes
(1) a frame having two beams, with each beam having a top surface,
(2) two cross frame elements connecting said beams together,
(3) an axle-engaging element mounted on top of said beams and extending from one beam to another and having an axle-engaging element top surface and an axle-engaging element forward surface connected to said axle-engaging element top surface,
(4) wheels mounted beneath said beam surfaces,
said beams and said wheels being sized to position said beam top surfaces at a third height above the ground which third height is greater than the first height but which is less than a combined total of the first and said second heights, and said axle-engaging element forward side surface is positioned above said beam top surfaces with the axle-engaging element top surface being located at a fourth height above the ground that is greater than the combined total heights of the first height and said second height so that said axle-engaging element forward side surface engages the trailer axle when the trailer wheels rest on top of said top sections and said beams will support said wheels above the ground when the axle rests on said beam top surfaces.

4,930,968

METHOD AND APPARATUS FOR EMPTYING PACKAGES, ESPECIALLY BAGS

Tomas Borglund, Sandgatan 6, S-260 40 Viken, Sweden

PCT No. PCT/SE87/00338, § 371 Date Jan. 23, 1989, § 102(e) Date Jan. 23, 1989, PCT Pub. No. WO88/00908, PCT Pub. Date Feb. 11, 1988
PCT Filed Jul. 16, 1987, Ser. No. 303,727
Claims priority, application Sweden, Jul. 28, 1986, 8603231
Int. Cl.[5] B65B 69/00; B65G 65/24
U.S. Cl. 414—412 11 Claims



6. An apparatus for emptying packages, especially bags, of their contents, said apparatus comprising a casing (2), an adjacent end all (6), a cutting and feeding screw (4) rotatably mounted within the casing (2) and consisting essentially of a shaft (12) and a screw blade (14) mounted thereon, said casing (2) having a peripheral opening (26) through which said bags are adapted to be introduced into said screw (4) for cutting by rotation of said screw, and one of said casing (2) and the end wall (6) having perforations (28) through which the bag contents are adapted to be removed characterized in that said casing (2) at a rear end of said screw (4) is closed by means of the end wall (6) connected onto the casing (2); that the apparatus further comprimises means (10, 2, 4) for rotating said screw in a first direction (B) for advancing cut bags (33) toward said end wall, the rear end of the rotating screw causing the cut bags (33) to tumble about within said casing (2) at the said end wall (6) for separating the contents from the cut bags; and said means for rotating rotates said screw (4) in a second direction (F) for advancing emptied bags (33) in a direction toward a front end of said screw (4) to a bag discharge opening (36) which is provided in said casing (2) and through which emptied bags (33) leave said casing (2).

4,930,969

RAIL LIFT G..TE APPARATUS AND STORAGE SCHEME

Hartford P. Langer, 2074 Edgerton St., St. Paul, Minn. 55117

Filed Aug. 11, 1988, Ser. No. 231,228
Int. Cl.[5] B60P 1/44
U.S. Cl. 414—540 17 Claims

1. A rail type lift, suitable for attachment to a vehicle, comprising:

(a) opposed elongate members arranged in a substantially vertical manner, said elongate members defining a substantially vertical mean plane;

(b) a platform having a surface which is generally horizontally disposed, whereby said platform's horizontal disposition defines an operating position;

(c) means for operatively connecting said platform to said elongate members, said connection means being substantially within said mean plane;

(d) means for raising and lowering said platform and said connection means relative to said elongate members; and

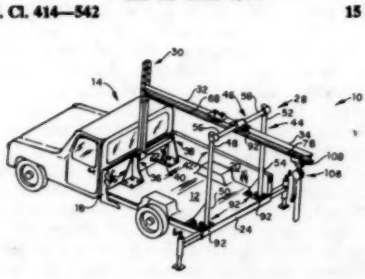
(e) means for moving said platform to a stored position whereby said stored position is transversely opposed with respect to said operating position relative to said elongate members whereby said elongate members remain in a substantially vertical position, and wherein said connection means remain substantially within said mean plane and operatively connected to said platform.

4,930,970

COLLAPSIBLE HOIST FOR A TRUCK BED

Nita K. Sunderland, R.R. 1, Washington, Tazewell County, Ill. 61571

Filed Jun. 26, 1989, Ser. No. 371,317
Int. Cl.[5] B60P 1/54
U.S. Cl. 414—542 15 Claims



1. A hoisting apparatus (10) for a truck, comprising:

a first base frame (26) having first and second end portions (36,38) and being connectable to the truck (14);

a second base frame (28) having first and second legs (42,44) and being pivotally connectable to the truck (14) at a location spaced from said first base frame (26);

an upright (30) being pivotally connected to and slidable along said first base frame (26) between a first position at which said upright is adjacent said first base frame first end portion (36) and extending upwardly from the first base frame (26) and a second position at which the upright (30) is positioned adjacent said first base frame second end portion (38) and extends generally horizontally;

a first overhead beam (32) having first and second end portions (64,66), a track (68), and a length "L", said first beam (32) being pivotally connectable at said second end portion (66) to said upright (30), said length "L" being less than the distance between said base frames (26,28);

a second overhead beam (34) having first and second end portions (72,74), and a track (78), said second beam (34) being pivotally connected to and slidable along said second base frame (28), between a first position at which the first end portions (64,72) of the beams (32,34) are adjacent and connectable to one another, the tracks (68,78) of the beams (32,34) are aligned one with the other, and extend generally horizontally, and a second position at which the second beam (34) is adjacent one of the second base frame legs (42,44) and the second beam (34) and second base frame (28) extend substantially horizontally;

first means (80) for releasably maintaining the first overhead beam (32) generally horizontally at the spaced apart positions of the overhead beams (32,34); and

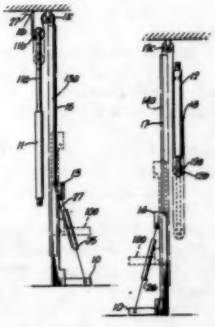
means (92) for releasably maintaining the second base frame (28), the upright (30) and the first and second overhead beams (32,34) at said preselected positions.

4,930,971

LIFT PLATFORM FOR ROAD VEHICLES AND TRAILERS

Frederick G. Wilson, 49 Old Hillsborough Rd., Lisburn, County Antrim, Ireland

PCT No. PCT/GB88/00111, § 371 Date Nov. 2, 1988, § 102(e) Date Nov. 2, 1988, PCT Pub. No. WO88/06108, PCT Pub. Date Aug. 25, 1988
PCT Filed Feb. 19, 1988, Ser. No. 263,776
Claims priority, application United Kingdom, Feb. 21, 1987, 8704108
Int. Cl.[5] B60P 1/44; B66B 9/04
U.S. Cl. 414—545 4 Claims



3. A lift platform for location at the rear of a road vehicle having first and second opposed interior side walls, comprising;

a horizontally extending platform member movable vertically between at least one vehicle floor level and substantially ground level;

first and second fluid actuated rams comprising first and second cylinders, respectively, first and second pistons associated respectively with said first and second cylinders, and first and second piston road associated respectively with said first and second pistons, said first and second pistons rods extending in opposite directions from said respective first and second cylinders, said first ram being located vertically on the first interior side wall

adjacent the rear of the vehicle and said second ram being located vertically on the second interior side wall adjacent the rear of the vehicle;

first fluid pressure supply means for feeding pressurized fluid to said first cylinder of said first ram to one side of said first piston to move said first piston a distance in one vertical direction;

second fluid pressure supply means for feeding pressurized fluid from said first cylinder at the other sid of said first piston to said second cylinder of said second ram to move said second piston the same distance as said first piston in the same vertical direction as said first piston;

linkage means for connecting said first and second rams to said platform member; and

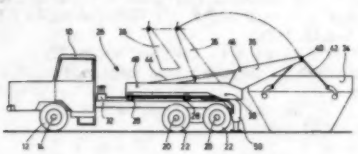
fluid equalizing means connected between said first and second rams for setting the horizontal level of said platform member.

4,930,972

MATERIAL HANDLING VEHICLES

Robert Little, 1063 White Oak Drive, Burlington, Ontario, Canada

Filed Sep. 8, 1989, Ser. No. 405,384
Int. Cl.[5] B65F *3/02*
U.S. Cl. 414—549 **8 Claims**



1. A load-carrying platform for use with a lugger truck having front and rear running wheels and a truck chassis, comprising:

a platform member having front and rear ends and providing a platform surface on which a drop-off container can be deposited;

the platform member comprising a pair of container lifting arms mounted adjacent the rear end of the platform member about a horizontal pivot axis for movement between a rear position in which a container on the ground is engaged and disengagesd, and a forward position in which a container is disposed on the platform surface, and motor means connected between the platform member and the lifting arms for moving the arms in said movement;

the platform member also comprising bearing means on its underside for engagement with cooperating bearing means on the truck chassis to permit forward/rearward movement of the platform member on the truck chassis, retaining means operable between the platform and the truck chassis to maintain the platform in engagement with the truck chassis during said forward/rearward movement, and motor means for connection between the platform member and the truck chassis for moving the platform member on the truck chassis in said movement;

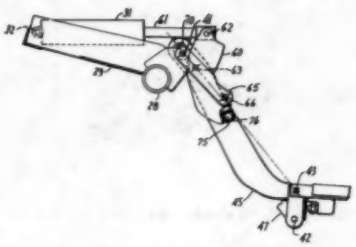
whereby the platform member is movable to a rear position in which a drop-off container is loaded onto and unloaded from the platform member, and to a forward position with a drop-off container loaded thereon to distribute the load of the container more evenly between the truck front and rear running wheels.

4,930,973

TILTABLE TAILGATE LIFT

Morris D. Robinson, Redondo Beach, Calif., assignor to Waltco Truck Equipment Co., Inc., Gardena, Calif.

Filed Mar. 30, 1989, Ser. No. 331,335
Int. Cl.[5] B60P *1/44*
U.S. Cl. 414—557 **10 Claims**



1. A tiltable lift for raising and lowering articles form a lower level to an upper level which corresponds to a vehicle bed, and selectably operable in a lift/lower mode and in a tilt mode, said lift being mounted to the vehicle and comprising:

a base attachment to said vehicle;

a platform having an upper area to carry articles;

an upper base pivot and a lower base pivot on said base, defining a base leg between said upper base pivot and said lower base pivot;

an upper platform pivot and a lower platform pivot on said platform, defining a platform leg between said upper platform pivot and said lower platform pivot, lengths of said base and platform legs being substantially equal, said platform being attached to said platform leg;

a rigid reference, having a length, arm pivotally mounted to said lower base pivot and to the lower platform pivot, defining a reference length between said lower base pivot and said lower platform pivot;

a rigid lift arm pivotally mounted to said upper base pivot and to said upper platform pivot enabling an effective length of the lift arm between said upper base pivot and upper platform pivot to be varied between a length substantially equal to said reference length respective to parallelogram operation in said lift/lower mode in which effective lengths of said arms are substantially equal and said platform is maintained substantially level, and a longer length respective to quadrilateral operation in said tilt mode in which said platform is tilted because said effective arm lengths are substantially unequal;

a rigid tilt link pivotally mounted to said upper base pivot;

a driver rotatably mounted to said lift arm at a prime pivot and to said tilt link at a second pivot on said tilt link, said prime pivot, second pivot, and upper base pivot being so disposed and arranged that when the platform is substantially level and in its lift/lower mode, a line drawn through said upper base pivot and said prime pivot passes beneath said second pivot whereby said tilt link forms an over-center toggle which forces an end of a slot against said upper base pivot and establishes the effective length of the lift arm substantially equal to the length of the reference arm, and when said driver is rotated from the substantially level position, said second pivot crosses said line and the tilt link enables the lift arm to elongate between the upper base pivot and the upper platform pivot whereby to enable the platform to tilt; and

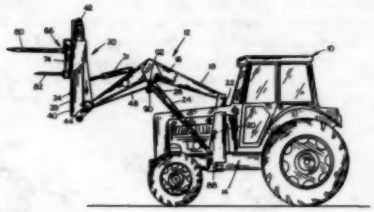
power means to rotate said driver.

4,930,974

EXTENDER FOR A TRACTOR LOADER

Joseph W. Langenfeld, and Neal W. Westendorf, both of Onawa, Iowa, assignors to Westendorf Mfg. Co., Inc., Onawa, Iowa

Filed Sep. 25, 1986, Ser. No. 911,506
Int. Cl.[5] B66C 1/22
U.S. Cl. 414—631 5 Claims



1. In combination,
a tractor,
a front loader mounted on said tractor,
said loader including a loader frame means having a pair of upstanding towers, a pair of boom arms pivotally mounted to the upper end of said towers and extending forwardly of said tractor, and a pair of first hydraulic cylinder means connected between said boom arms and the lower ends of said towers for raising and lowering said boom arms,
a normally generally upright extender frame means operatively pivotally mounted, about a horizontal axis, on the forward ends of said boom arms,
second hydraulic cylinder means extending between said boom arms and said extender frame means for pivotally moving said extender frame means relative to said boom arms,
a slide means vertically movably mounted on said extender frame means,
a materials handling attachment operatively secured to said slide means,
and a pair of flexible cable means connected at one end to the lower ends of said towers, said pair of cable means passing around pulley means connected to said boom arms adjacent the connection of said first hydraulic cylinder means, and connected at the other ends to said slide means, for vertically moving said slide means relative to said extender frame means upon operation of said first hydraulic cylinder means so that said materials handling attachment will be raised or extended above the position normally permitted by said boom arms.

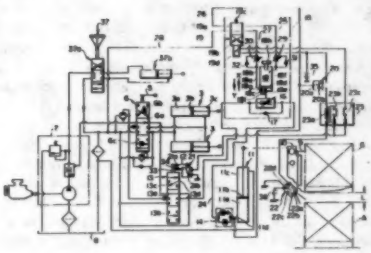
4,930,975

CONTROL FOR LOAD CARRIER FOR INDUSTRIAL VEHICLE

Hideki Ito, Tokyo, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan

Filed Mar. 11, 1988, Ser. No. 167,270
Claims priority, application Japan, Mar. 20, 1987, 62-65955
Int. Cl.[5] B65E 47/00; F15B 15/22
U.S. Cl. 414—635 16 Claims

9. A system for controlling a load carrier for an industrial vehicle, the system comprising:
a load carrier;
a lift cylinder subjected to a weight of the load carrier and hydraulically extendable to lift the load carriers;
a lift control valve which is shiftable between a neutral position and a predetermined position so that discharge of hydraulic fluid from the lift cylinder is allowed to permit a downward movement of the load carrier;
a variable flow regulator fluidly disposed between the lift cylinder and the lift control valve, the variable flow regulator having a first state which imparts a first degree of flow restriction to a hydraulic fluid flow passing therethrough in one direction from the lift cylinder to the lift control valve, and a second state which imparts a second degree of flow restriction to the hydraulic fluid flow passing therethrough in the one direction;
electromagnetic means for shifting the variable flow regulator between the first and second states; and
a control circuit which selectively energizes and deenergizes the electromagnetic means in response to the downward movement of the load carrier,
wherein the first degree of flow restriction is a maximum degree thereof, and the second degree of flow restriction is a minimum degree thereof,
wherein the variable flow regulator comprises a variable flow orifice valve fluidly disposed between the lift cylinder and the lift control valve, a hydraulic actuator including a second cylinder and a piston slidable therein and operatively connected to the variable flow orifice valve to vary an opening area of the variable flow orifice valve in response to slidable movement of the piston in the second cylinder, and a selector valve means operable by the electromagnetic means for allowing a supply of hydraulic fluid from the lift cylinder to a portion of the second cylinder and discharge of hydraulic fluid from a remaining



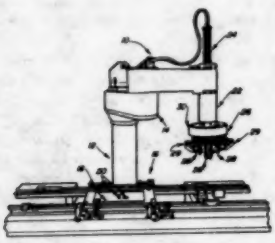
portion of the second cylinder in response to deenergization of the electromagnetic means, further allowing discharge of hydraulic fluid from the portion of the second cylinder and a supply of hydraulic fluid from the lift cylinder to the remaining portion of the second cylinder in response to energization of the electromagnetic means,
wherein the control circuit comprises a relay including a relay coil, a normally open relay switch connected in series with the relay coil and a normally closed relay switch connected in series with the electromagnetic means, a pressure sensor means including a first switch connected in series with the relay coil for rendering the first switch closed in response to a pressure rise in the lift cylinder, a load carrier height sensor means including a second switch connected in series with the relay coil for rendering the second switch closed when a distance between a lower portion of the load carrier and a surface on which the load carrier is to land becomes shorter than a predetermined value, and a lift control lever position sensor means including a third switch connected in series with the normally open and normally closed relay switches, respectively, rendering the third switch closed when the lift control valve is shifted to the predetermined position.

4,930,976

MULTIPLE GRIPPER TURRET FOR PART HANDLING DEVICES AND METHOD OF HANDLING PARTS

Paul F. Spacher, Rochester, and David J. Vadas, Penfield, both of N.Y., assignors to Alliance Automations Systems, Inc., Rochester, N.Y.

Filed Mar. 28, 1989, Ser. No. 329,701
Int. Cl.[5] B23Q *3/155*
U.S. Cl. 414—744.8 7 Claims



1. In combination with a multiple gripper turret (26) for a part handling device (10) of the type including a member (22), means for rotating said member (22) about an axis (a), a gripper turret (26) secured to said member (22) to be rotated therewith, said gripper turret (26) having a plurality of gripper mechanisms (28) arrayed about the axis (a) of rotation of said part handling device rotary member (22), each of said gripper mechanisms having part gripping finger portions (34), and means (52, 54) for positioning each gripper mechanism (28) to enable shifting of each gripper mechanism (28) between an extended and retracted position, characterized by said positioning means (52, 54) including means for (52, 54) shifting the associated gripper mechanism (28) from a fully extended position aligned with said axis of rotation (a) of said rotary member (22), to a retracted position shifted radially from the axis of rotation (a), all of said gripper mechanisms (28) able to be shifted in a converging direction towards said axis of rotation (a);

said positioning means (52, 54) comprising a parallel linkage (52, 54) supporting the associated gripper mechanism (28) for swinging movement in a radial direction;

a locating feature (80) fixed to said member (22) against which each gripper mechanism (28) moves in shifting to said fully extended position, each of said gripper mechanism (28) formed with a mating feature (84) to enable precise location of each of said gripper mechanisms (28) to be aligned with said axis of rotation (a) of said member (22) as said gripper mechanism (28) is shifted to said fully extended position. wherein said parallel linkage (52, 54) causes a primarily downwardly motion in shifting from the retracted to the fully extended position and then causes an upward movement of the connected gripper mechanism at a final portion of shifting to said fully extended position, and wherein said features comprise a ball (80) and seat (84) moved together by said upward final portion of shifting movement of said gripper mechanism.

4,930,977

ENVELOPE HANDLING SYSTEM

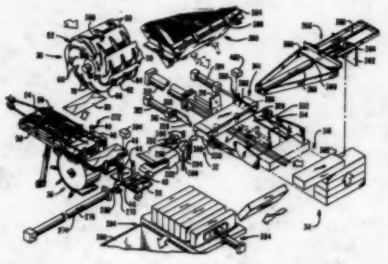
John A. Beeman, Dayton, Ohio; James L. Leep, Martin, Mich.; Wayne S. Marvin, Kalamazoo, Mich.; Floyd R. Solt, Garland, Tex., and Troy F. Smith, Kalamazoo, Mich., assignors to The Mead Corporation, Dayton, Ohio

Filed Jan. 16, 1987, Ser. No. 4,365
Int. Cl.[5] B65H *29/40*
U.S. Cl. 414—790.8 23 Claims

1. An apparatus for repeatedly stacking sheet-like articles onto a lower level conveyor in vertical stacks of predetermined numbers of articles comprising:

spider feeder means for continuously removing articles from an upper level conveyor and releasing said articles to fall in a substantially vertical direction to collect in a first vertical stack in a stacking zone below said spider feeder means;

hold back means projectable into said stacking zone for interrupting a flow of said articles from said spider feeder means to said first stack after a predetermined number of said articles have collected into said first stack such that articles leaving said spider feeder means collect upon said hold back means to form a second stack, said hold back means being retractable from said stacking zone to allow said second stack to drop downwardly to said lower level



conveyor subsequent to completion and removal of said first stack from said stacking zone; and

transfer means projectable into said stacking zone below said spider feeder means for urging downwardly against a topmost article of, and thereby compressing a height of a completed stack, said transfer means being retractable from stacking zone to allow articles accumulated by said hold back means to drop downwardly, said transfer means including second finger means projectable into and retractable out of said loading zone for engaging a topmost sheet of a completed stack and means for urging said second fiber means downwardly against a stack, said urging means having a resilient connection with said second finger means whereby said second finger means may pivot downwardly in response to downward force of an article exerted thereupon by said spider feeder.

4,930,978

COMPRESSOR STAGE WITH MULTIPLE VENTED INDUCER SHROUD

Jai K. Khanna, Indianapolis; Norman G. Silvey, Greenfield, and Charles D. Williams, Indianapolis, all of Ind., assignors to Household Manufacturing, Inc., Prospect Heights, Ill.

Filed Jul. 1, 1988, Ser. No. 214,281
Int. Cl.[5] F04D *29/42*
U.S. Cl. 415—58.3 30 Claims

1. A gas compressor stage comprising:

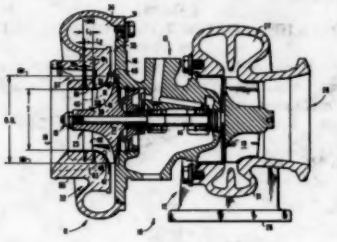
an impeller including a blade, said blade having a leading edge, an outward free edge and a trailing edge;

means for driving said impeller;

a compressor housing having a gas intake and a gas diffuser passageway downstream thereof, said impeller being located in said housing along a gas flow path between said gas intake and said gas diffuser passageway, wherein said housing includes a shroud wall upstream of said gas diffuser passageway and having an internal shroud surface in close proximity to said radially outward free edge of said blade;

a first vent in said shroud wall being located in said shroud wall upstream of said trailing edge of said impeller; and

a second vent in said shroud wall being located in said shroud wall upstream of said first vent, wherein said impeller further includes a hub and defines a meridional path between said hub and said radially outward free edge, wherein said meridional path intersects with said leading



edge of said impeller to define a meridional datum, wherein said meridional path intersects with said trailing edge to define a high pressure datum, and wherein said first vent is located between said meridional datum and said high pressure datum.

4,930,979

COMPRESSORS

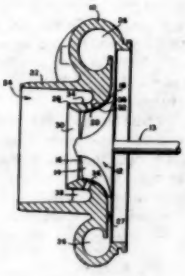
Frank B. Fisher, and Paul J. Langdon, both of Huddersfield, England, assignors to Cummins Engine Company, Inc., Columbus, Ind.

Continuation of Ser. No. 945,713, Dec. 23, 1986, Pat. No. 4,743,161. This application May 9, 1988, Ser. No. 190,968

The portion of the term of this patent subsequent to May 10, 2005, has been disclaimed.

Int. Cl.[5] F04D *29/42*

U.S. Cl. 415—58.4 **43 Claims**



1. A compressor operable between choked flow and surge line conditions for compressing gas, comprising:

a housing having an inner wall and an outer wall;

an impeller wheel mounted for rotation in a defined area within said housing and having a plurality of vanes each of which has a leading edge, a trailing edge and an outer free edge;

said outer wall extending in an axial direction toward said impeller wheel and having a first portion forming a gas intake and a second portion surrounding said inner wall;

said inner wall forming an inlet to said impeller wheel in a region adjacent said leading edges of said vanes and having an inner surface, at least part of said inner surface of said inner wall being in close proximity to said outer free edges of said vanes;

said inner wall and said second portion of said outer wall forming a chamber separated from and at least partially surrounding said vanes and in communication with said gas intake; and,

a flowpath through said inner wall between said chamber and said defined area, said flowpath through said inner wall being located adjacent to a portion of said outer free edges of said vanes downstream not exceeding 34% of the total meridional length and having a total cross sectional flow area at the inner surface of said inner wall at least 13% of an inducer annular area defined by the area of said inlet minus the area occupied by said impeller wheel to permit gas movement in one direction or in the other direction through said flowpath in response to the pressure differential between said chamber and said defined area to broaden the range of operation between the choked flow and the surge line conditions for said compressor.

4,930,980

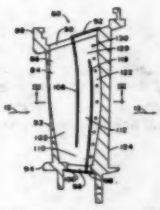
COOLED TURBINE VANE

William E. North; David T. Entenmann, both of Winter Springs, and John P. Donlan, Oviedo, all of Fla., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Feb. 15, 1989, Ser. No. 310,554

Int. Cl.[5] F01D *5/18*

U.S. Cl. 415—115 **5 Claims**



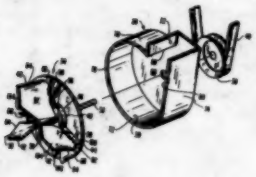
1. A cooled turbine vane for use in an multistage gas turbine having rows of fluid cooled vanes radially extending from seal housings into the path of gases flowing generally axially through the turbine, the cooled turbine vane having a hollow airfoil body with ports providing flow communication between its hollow interior and the gas flow path, an outer shroud with a coolant fluid inlet into the hollow interior of the airfoil body providing flow communication with a source of coolant fluid, and an inner shroud with a coolant fluid outlet from the hollow of the airfoil body providing flow communication with a seal housing, said airfoil body having in its hollow interior a multipass coolant fluid channel comprising a first channel extending along the leading surfaces of the airfoil body from the inlet in the outer shroud to a return bend defined by the airfoil body and the inner shroud, and a subsequent channel in fluid flow communication with the first channel extending along the trailing surfaces of the airfoil body in fluid flow communication with the ports, the inlet in the outer shroud and the outlet in the inner shroud being aligned with said first channel, whereby a portion of the coolant fluid flows from the vane through the ports directly into the gas flow path and a portion of the coolant fluid flows through the outlet in the inner shroud.

4,930,981

LOW NOISE IMPELLER

Dean M. Walker, Loveland, Colo., assignor to Walker Manufacturing Company, Fort Collins, Colo.

Filed Aug. 18, 1989, Ser. No. 395,961
Int. Cl.[5] F04D *29/66*
U.S. Cl. 415—119 17 Claims



1. A fluidized particulates blower comprising:

a housing having an inlet in one wall through which fluidized particulates are delivered into the front of a chamber defined by said housing and having an outlet in another wall through which said particulates are impelled from said chamber;

a rotatably mounted shaft projecting into the interior of said chamber;

a plurality of blades circumferentially spaced around and projecting laterally from said shaft within said chamber with said blades having a shape selected to substantially maximize the impulsive pressure on the delivered particulates through said outlet upon rotation of said shaft;

each of said blades having a notch defined inwardly toward said shaft from the laterally outer blade periphery with said notch having a size and shape selected to significantly reduce noise created by movement of said blade across said outlet;

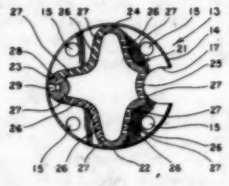
and a plurality of paddles individually projecting outwardly from and circumferentially spaced around said shaft adjacent to and circumferentially aligned with respective ones of said notches with the spacing of each paddle from the corresponding adjacent blade being selected to augment reduction of said noise while maintaining maximization of said pressure.

4,930,982

SUCTION INLET BOWL FOR A SUBMERSIBLE PUMP

Alan B. Channell, Ashland, Ohio, assignor to McNeil (Ohio) Corporation, St. Paul, Minn.

Filed Nov. 18, 1988, Ser. No. 275,407
Int. Cl.[5] F04D *13/08*
U.S. Cl. 415—121.2 14 Claims



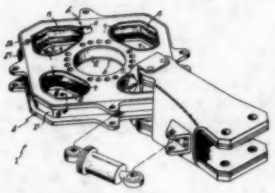
1. A submersible pump including a pump unit driven by a motor, and a suction inlet bowl, the inlet bowl comprising a generally cylindrical upper portion adapted to attach to the pump unit, a generally cylindrical base adapted to attach to the motor, and a fluid inlet portion between said upper portion and said base, said fluid inlet portion including a continuous arcuate wall having a plurality of lobes generally at the periphery of said generally cylindrical upper portion and base and concave portions between adjacent of said lobes, and a plurality of generally vertical slots through which fluid may pass positioned in said concave portions such that none of said vertical slots lie in a plane parallel to a plane tangent to said generally cylindrical upper portion and base.

4,930,983

HYBRID HELICOPTER ROTOR HUB RETENTION PLATE

Francis E. Byrnes, White Plains, N.Y., and David N. Schmaling, Oxford, Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Sep. 26, 1988, Ser. No. 248,672
Int. Cl.[5] B64C *11/06*
U.S. Cl. 416—134 A 8 Claims



1. A main helicopter rotor hub retention plate said retention plate comprising;

a. a metallic perimeter support structure said structure having an upper surface and a lower surface;

b. a plurality of metallic spokes extending inwardly from said perimeter structure to a hub, said spokes having an upper surface and a lower surface, said perimeter structure, hub and spokes defining at least three holes;

c. said perimeter structure and spokes having a web disposed between upper and lower flanges said web substantially perpendicular to the plane of the rotor hub and said upper and lower flanges substantially parallel to said rotor hub, said upper surface disposed on said upper flange and said lower surface disposed on said lower flange, and said perimeter structure and spokes having a cross-section that is substantially I-shaped;

d. fiber reinforced resin matrix composite bonded to said upper surface, said composite capable of reacting to bending loads, in-plane shear and axial loads; and

e. fiber reinforced resin matrix composite bonded to said lower surface, said composite capable of reacting to bending loads, in-plane shear and axial loads.

4,930,984

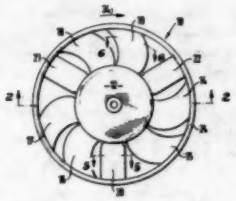
IMPELLER

Bruno Kesel; Gerhard Zink, both of Bühl, and Karin Winter, Gaimersheim, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Jul. 13, 1989, Ser. No. 379,804
Claims priority, application Fed. Rep. of Germany, Sep. 21, 1988, 3832026
Int. Cl.[5] F04D *29/66*
U.S. Cl. 416—203 5 Claims

1. An impeller comprising a central hub part; a plurality of first vanes extending from said central hub part and all having a sickle-shaped cross-section of a predetermined size, said first vanes being spaced from each other and having an end remote from said central hub part; a plurality of second vanes extending from said central hub part and all having a shaped cross-section different from said sickle-shaped cross-section of said first vanes, said shaped cross-section of said second vanes being the same for all second vanes, and each of said second vanes

being located in a space between two adjacent first vanes and having an end remote from said central hub part; and a ring



surrounding the ends of said first and second vanes and being connected with said ends.

4,930,985

WIND POWER PLANT

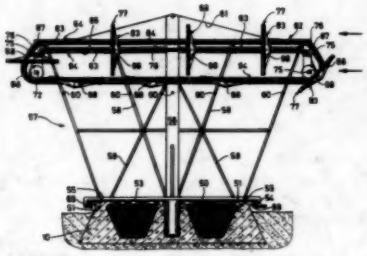
Ferdinand Klute, Fixberg 6, Paderborn 4790, Fed. Rep. of Germany

Filed Sep. 9, 1988, Ser. No. 242,749

Claims priority, application Fed. Rep. of Germany, Sep. 10, 1987, 3730301

Int. Cl.[5] F03D *5/02*

U.S. Cl. 416—8 **5 Claims**



1. A wind powered generating plant comprising:

a support frame adapted to rotate around a generally vertical axis so as to maintain said plant in proper alignment with the prevailing wind;

an air passage structure mounted on said support frame adapted to receive wind in one entry end and allow flow of said wind therethrough to an exit end;

pulley means in said passage structure with endless chain means disposed on said pulley means for movement along the length of said passage structure in a direction generally parallel to the flow of wind through said passage structure;

generating means connected to and driven by said pulley means;

wind engaging members pivotally mounted on said chain means so as to move along the length of said passage structure under the force of the wind passing therethrough;

guide means in said passage structure adapted to maintain said members generally orthogonal to the flow of air in the passage during movement with the wind so as to maximally engage the wind flow and further adapted to pivot said members generally parallel to the flow of air during movement against the wind; and

a plurality of segment surfaces supported on said wind engaging members shaped to engage a portion of the wind flow so as to move said members, said chain means, and said pulley means, said segment surfaces mutually spaced from each other so as to enhance the conveyance of a portion of said wind flow therebetween and therearound and on to the subsequent wind engaging member in the air passage structure.

4,930,986

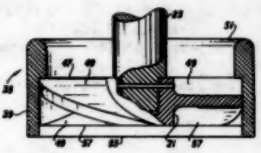
APPARATUS FOR IMMERSING SOLIDS INTO FLUIDS AND MOVING FLUIDS IN A LINEAR DIRECTION

Paul V. Cooper, Cleveland, Ohio, assignor to The Carborundum Company, Niagara Falls, N.Y.

Filed Jul. 10, 1984, Ser. No. 629,526

Int. Cl.[5] B63H *1/16*

U.S. Cl. 416—189 **9 Claims**



1. An axial flow impeller assembly comprising:

(a) impeller means comprising;

(i) hub means adapted to be rotatably connected to drive means; and

(ii) at least one impeller blade, mounted concentrically to said hub such that rotation of said hub means will cause concurrent and concentric rotation of said at least one impeller blade; and

(b) drum means, comprising a concentrically hollow bored cylindrical section, concentrically mounted and fixed to the circumferential periphery of said at least one impeller blade such that rotation of said hub means and said at least one impeller blade will cause concurrent and concentric rotation of said drum means;

(c) said impeller assembly being adapted to linearly move fluid therethrough while substantially preventing radial flow of said fluid from the circumferential periphery of said at least one impeller blade; and

(d) said at least one impeller blade having a drop angle which is sufficiently shallow to substantially prevent fluid turbulence and radial flow of fluids within said impeller assembly.

4,930,987

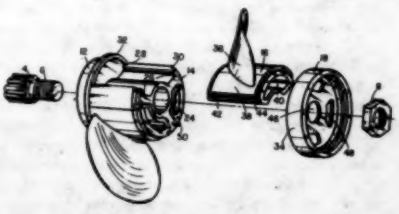
MARINE PROPELLER AND HUB ASSEMBLY OF PLASTIC

Brad Stahl, 778-B Peach St., San Luis Obispo, Calif. 93401

Filed May 24, 1989, Ser. No. 356,181

Int. Cl.[5] F01D *5/30*

U.S. Cl. 416—93 A **8 Claims**



1. A marine propeller and hub assembly comprising:

a hub portion including a plurality of extensions extending

axially outwardly from a central section, said central section including a central bore formed therein, said hub portion including a plurality of re-entrant cavities surrounding said central portion and formed between adjacent extensions;

a unitary blade and root portion configured to be slidably axially inserted into each of said re-entrant cavities, an axially extending exhaust passage formed in said root portion; and

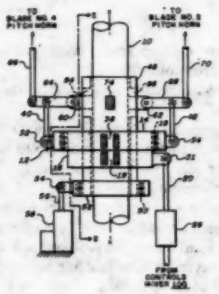
means for radially retaining said unitary blade and root portion within said re-entrant cavity.

4,930,988

INDIVIDUAL BLADE CONTROL SYSTEM FOR HELICOPTERS

Carl D. Griffith, 9114 Luna Del Oro NE., Albuquerque, N. Mex. 87111

Filed Jan. 2, 1989, Ser. No. 305,034
Int. Cl.[5] B64C 27/74
U.S. Cl. 416—114 **13 Claims**



1. An individual blade control system for a helicopter having a variable pitch sustaining rotor with at least four substantially horizontally disposed blades, comprising:

a substantially vertical shaft supporting said rotor and having first and second radially extended members flexibly coupled to opposing first and second ones of said rotor blades, respectively,

differential sleeve means slideably mounted for rotation and axial displacement with respect to a longtitudinal axis of said vertical shaft and having third and fourth radially extended members flexibly coupled to opposing third and fourth ones of said rotor blades, respectively, and orthogonal to said first and second radially extended members,

servo actuator means, responsive to a first control signal, and operably coupled to raise or lower said differential sleeve with respect to said vertical shaft,

swashplate means, mounted for rotation about said vertical shaft and having a first pair of radially extended members flexibly coupled to corresponding ones of said first and second members of said vertical shaft and a second pair of radially extended members flexibly coupled to corresponding ones of said third and fourth differential sleeve members,

swashplate support means in the form of an annular member slideably engaging said swashplate means and mounted for axial displacement along said shaft, said support means adapted for oblique displacement with respect to said longitudinal axis of said shaft, and having a plurality of radially extended members operably coupled to ones of a corresponding plurality of further servo actuator means, said plurality of further servo actuator means responsive to control mixer means,

means for applying a first control signal in accordance with a predetermined pitch control law to said servo actuator means, and

means for applying second control signals in accordance with said predetermined pitch control law to said plurality of further servo actuator means,

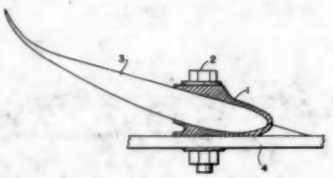
whereby ones of said rotor blades are selectively feathered to a predetermined pitch angle at a predetermined azimuth with respect to the heading of said helicopter in accordance with deflections of said differential sleeve means and said swashplate.

4,930,989

FIXED-ANGLE KEYING PIECE FOR BLADES OF AXIAL FANS

Antonio Mosiewicz, Milan, Italy, assignor to Cofimco S.r.l., Italy

Filed Apr. 20, 1988, Ser. No. 184,054
Claims priority, application Italy, Apr. 24, 1987, 20279 A/87
Int. Cl.[5] F04D 29/34
U.S. Cl. 416—204 R **1 Claim**



1. A fixed-angle keying piece for blades of axial fans, comprising a U-shaped cross section; an internal surface which perfectly fits the profile of the blade and an external surface which contacts an external face of a supporting plate assembled to a hub of the axial fan; first and second rigid sidewalls which are approximately the same length; a rounded bottom end connecting said sidewalls, said bottom end having a thickness which allows a slight bending thereof for inserting the blade into the keying piece;

wherein each blade is fastened to said supporting plate via one of the keying pieces by clamping the sidewalls of the keying piece tightly against an outer profile of the blade by means of at least one through bolt which passes through at least one hole formed in the keying piece, blade, and supporting plate, and wherein said keying piece is extruded as a continuous extruded article and then cut down into single keying pieces.

4,930,990

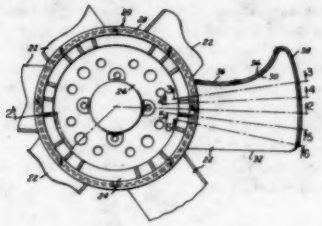
QUIET CLUTCH FAN BLADE

Stephen E. Brackett, Blenheim, Canada, assignor to Siemens-Bendix Automotive Electronics Limited, Chatham, Canada

Filed Sep. 15, 1989, Ser. No. 407,821
Int. Cl.[5] B63H 1/18, 1/26
U.S. Cl. 416—223 R **3 Claims**

1. A fan comprising a number of blades that are uniformly arranged about a hub, said blades being substantially identical, each blade comprising a leading edge that has inner, intermediate, and outer zones, said intermediate zone being forwardly skewed and said outer zone being rearwardly skewed to the

blade's trailing edge, said blade also having a pitch ratio that is continuously increasing with blade radius, and a tip curl in the



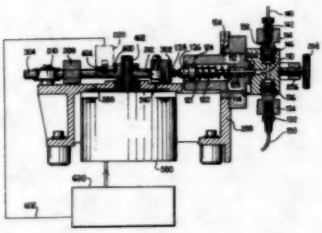
outer zone in which the blade's leading edge is rearwardly skewed.

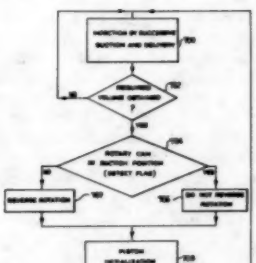
4,930,991

PISTON PUMP FOR HIGH PERFORMANCE LIQUID CHROMATOGRAPHY

Alain Bonneyrat, Saint-Martin du Tertre, and Christian Langlais, Domont, both of France, assignors to Gilson Medical Electronics (France), Villiers le Bel, France

Filed Jan. 30, 1989, Ser. No. 304,066
Claims priority, application France, Feb. 10, 1988, 88 01591
Int. Cl.[5] F04B 49/00
U.S. Cl. 417—18 **6 Claims**





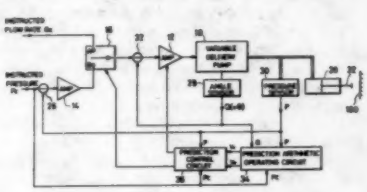
1. A pump comprising at least a pump body having a chamber communicating with an inlet duct and an outlet duct via respective inlet and outlet valves, a piston movable in sealed manner within said chamber, so as to inject a volume of liquid which i equal to the cylinder capacity of the pump, each time the piston performs one backward and forward motion, a cyclical actuator of the rotary cam type for cooperating with said piston to cause the slide, and a motor for driving the cam in an unchanging predetermined direction during injection operation, wherein the pump includes control means adapted, on detecting that a required volume has been injected, to determine the position occupied by the rotary cam and to return the piston to the initial position of its delivery stroke prior to injecting a following volume by reversing the direction of rotation of the motor during reinitialization of the piston whenever the rotary cam is positioned on its delivery slope on such detection and in contrast reinitializing the piston without reversing the direction of rotation whenever the rotary cam is positioned on its suction slope on such detection.

4,930,992

CONTROL APPARATUS OF VARIABLE DELIVERY PUMP

Kunihiko Takeuchi, Kawasaki; Yoshisuke Akita, Hasuda, and Osamu Hayakawa, Fuchu, all of Japan, assignors to Tokyo Keiki Company Ltd., Tokyo, Japan

Division of Ser. No. 216,417, Jul. 7, 1988, Pat. No. 4,886,422.
This application Sep. 18, 1989, Ser. No. 408,218
Int. Cl.[5] F04B 49/00
U.S. Cl. 417—20 **3 Claims**



1. A control apparatus of a variable delivery pump comprising:

flow rate detecting means for detecting a delivery flow rate of said variable delivery pump;

pressure detecting means for detecting a delivery pressure of the pump;

flow rate control means for controlling a delivery amount of the pump so as to keep a designated flow rate value which is indicated by a flow rate setting device until a control load stops;

pressure control means for controlling the pump delivery amount such that the delivery pressure which increases when the control load stops is held to a designated pressure value which is indicated from a pressure setting device;

switching means for switching a control mode to a pressure control when the pump delivery pressure exceeds a predetermined value during a flow rate control and for switching the control mode to the flow rate control when the pump delivery pressure is equal to or lower than said predetermined value during the pressure control; and

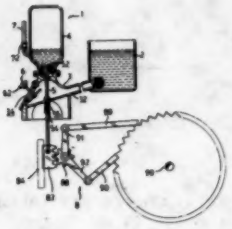
a gain arithmetic operating control section for calculating the product ($V\beta$) of a load volume (V) and a fluid compressibility (β) from an increasing speed of the delivery pressure when the control load stops and from the delivery flow rate at this time, and for controlling a feedback gain of said pressure control means on the basis of the calculated value of said product ($V\beta$).

4,930,993

ENERGY REGENERATIVE APPARATUS FOR A WATER HAMMER TYPE PUMP

Tai-Kang Han, and Tai-Feng Chang, both of No. 18, Lane 787, Sec. 2, Kuo Kuang Rd., Ta Li Hsiang, Taichung Hsien, Taiwan

Filed Jul. 7, 1989, Ser. No. 376,680
Int. Cl.[5] F04F 7/02
U.S. Cl. 417—226 3 Claims



1. An energy regenerative apparatus for a water hammer type pump generally comprising a water hammer type pump and an energy regenerative apparatus;

said water hammer type pump including a reservoir which is connected to a pump body by a pipe; a pressure tank being fixed on top of said pump body; a piston rod with a piston head being slidably provided in said pump body; a water passage between said pump body and said pressure tank being controllable by said piston head so as to control a flow of water from said pump body to said pressure tank; a flat valve being disposed between an outlet pipe and said pressure tank so as to prevent any reverse flow of water from said outlet pipe into said tank; and a water gate valve with a handle being provided on one side of said pump body for controlling a water passage of said pump body;

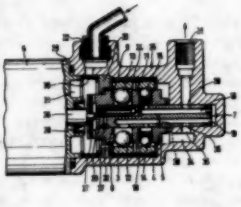
said energy regenerative apparatus including a rack being connected to a lower end of said piston rod; and a pinion being driven by said rack so as to drive a ratchet by means of a pair of rocker levels which are rotatable with said pinion so as to produce a power output from an axle of said ratchet by means of an up and down movement of said piston rod of said water hammer type pump.

4,930,994

RADIAL PISTON PUMP

Ludwig Budecker, Frankfurt am Main, Fed. Rep. of Germany, assignor to Alfred Teves GmbH, Frankfurt am Main, Fed. Rep. of Germany

Filed Mar. 6, 1987, Ser. No. 22,795
Int. Cl.[5] F04B 23/04
U.S. Cl. 417—286 7 Claims



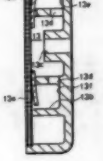
1. A combination radial piston pump and electric drive motor, said piston pump having an inlet and an outlet, first and second parallel working circuits between said inlet and said outlet, said first working circuit having a first pumping means coupled to said drive motor for delivering fluid at a first delivery rate from said inlet to said outlet, said second working circuit having a second pumping means coupled to said drive motor for delivering fluid at a second delivery rate from said inlet to said outlet, each of said pumping means having a suction side communicating with said inlet and a pressure side communicating with said outlet, and a throttle channel between the suction and pressure sides of said first pumping means for diverting flow from the pressure side to the suction side of said first pumping means in dependence on the pressure at said outlet and for diverting all such flow at a present pressure at said outlet.

4,930,995

DEVICE FOR REDUCING REFRIGERANT GAS PULSATIONS IN A COMPRESSOR

Shinichi Suzuki; Hiroyuki Deguchi; Takahiro Hamaoka, and Sokichi Hibino, all of Kariya, Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Kariya, Japan

Filed Jan. 24, 1989, Ser. No. 301,248
Claims priority, application Japan, Jan. 25, 1988, 63-8473[U]
Int. Cl.[5] F04B 39/12, 1/18
U.S. Cl. 417—312 3 Claims



1. In a refrigerant gas compressor having formed therein a plurality of cylinder bores, a discharge chamber communicable with each of said cylinder bores through a discharge port for receiving a refrigerant gas compressed in said each cylinder bore and then discharged out therefrom through said discharge port, and an exit port having an opening formed in said discharge chamber for allowing the refrigerant gas out of said compressor through said exit port, a device for attenuating pulsations of the refrigerant gas in said discharge chamber, comprising a plurality of cavities formed with different depths in said discharge chamber in communication therewith, each of said cavities being located in such facing relation to said discharge port that the refrigerant gas discharged through said discharge port is introduced into said cavity, and the area of said each cavity in transverse cross-section being larger than that of said discharge port.

4,930,996

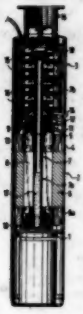
IMMERSION PUMP ASSEMBLY

Niels D. Jensen, and Jorgen Christensen, both of Bjerringbro, Denmark, assignors to Grundfos International a/s, Bierringbro, Denmark

Filed Aug. 17, 1989, Ser. No. 395,704
Claims priority, application Fed. Rep. of Germany, Aug. 23, 1988, 3828512
Int. Cl.[5] F04B 39/06; F01D 5/08
U.S. Cl. 417—373 5 Claims

1. An immersion pump assembly comprising a pump, a wet-rotor motor, and a shaft common to the motor and the pump connecting the motor in driving relationship with the pump, wherein the shaft is hollow and the assembly further comprises

closure means for the hollow shaft and a fluid partially filling the shaft, whereby the shaft and said fluid constitute a heat pipe



system for dispersing waste heat from the motor in liquid conveyed by the pump.

4,930,997

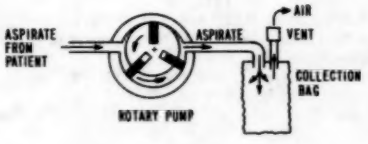
PORTABLE MEDICAL SUCTION DEVICE

Alan N. Bennett, 2342 Hosp Way, Carlsbad, Calif. 92008

Filed Aug. 19, 1987, Ser. No. 87,153

Int. Cl.[5] F04B *39/14;* A61M *31/00*

U.S. Cl. 417—410 **24 Claims**



1. A portable suction device, comprising:

a support frame;

rotation means supported by said support frame for providing rotary motion; and

disposable and readily removable collection means supported by said support frame for removing and collecting a suspension when said rotation means is providing rotary motion, said collection means including;

a suction tube;

a collection container;

a pump, having a working member operating on the suspension being pumped and a rigid housing in which the working member operates, wherein said suspension is pumped between said working member and said rigid housing, said pump being connected at its inlet to said suction tube and at its outlet to said collection container, said pump having coupling means for allowing readily operable coupling and decoupling to the output of said rotation means;

wherein said collection means is a unitary assembly suitable for coupling and decoupling in assembled form to the output of said rotation means and in which the pump is essentially entirely non-metallic.

4,930,998

FUEL PUMP

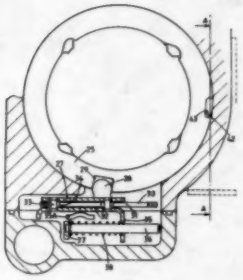
Robert H. Scott, Chatham, England, assignor to Lucas Industries Public Limited Company, Birmingham, England

Filed Jul. 22, 1988, Ser. No. 222,948

Claims priority, application United Kingdom, Jul. 22, 1987, 8717326

Int. Cl.[5] F04B *19/22*

U.S. Cl. 417—462 **3 Claims**



1. A fuel injection pump of the rotary distributor type for supplying fuel to an internal combustion engine and of the kind comprising a body part, a rotary distributor member supported in the body part and arranged in use to be driven in timed relationship with the associated engine, a transverse bore formed in the distributor member, a pumping plunger slidable in the bore, a cam follower at the outer end of the plunger, an annular cam ring surrounding the distributor member and having cam lobes on its internal peripheral surface for engagement by the cam follower, said cam lobes imparting inward movements to the plunger as the distributor member rotates, passage means for conveying fuel displaced from the bore to a plurality of outlets in turn, further passage means for feeding fuel to the bore to effect outward movements of the plunger, a fuel control device operable to allow the volume of fuel supplied to the bore to be varied, a pair of annular angularly adjustable stop rings positioned in the body part on opposite sides of the cam ring respectively, said stop ring defining internal surfaces for engagement by the cam follower to limit the outward movement of the plunger and thereby to limit the maximum amount of fuel which can be supplied by the pump, a saddle member movable in the body part, the saddle member and the stop rings defining interengaged coupling elements respectively whereby the angular setting of the stop rings can be adjusted by moving the saddle member, resilient means acting to move the stop rings in a direction to reduce the amount of fuel which can be supplied by the pump and a stop for limiting the movement of the stop rings under the action of said resilient means, characterised by a fluid pressure operable piston located within a cylinder formed in the body part, a pin extending laterally from said piston and located in an elongated recess formed in one of the stop rings, further resilient means biasing said piston in the direction to urge the pin into engagement with one end wall of the recess thereby to move the stop rings to a position in which an excess of fuel can be supplied by the injection pump, the piston being moved by fluid under pressure against the action of the further resilient means to allow the stop rings to be moved to reduce the maximum amount of fuel which can be supplied by the injection pump.

4,930,999

PRECOMPRESSION METERING PUMP WITH IMPROVED PRIMING

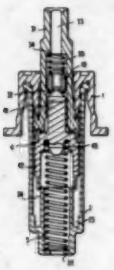
Michel Brunet, Sainte Colombe La Commanderie; Patrick Di Giovanni, Elbeuf; Claude Jouillat, Montigny Sur Avre; Jean-Pierre Lisa, Le Neubourg, and Hervé Penanneac'h, Verneuil-Sur-Avre, all of France, assignors to Societe Technique de Pulverisation - STEP SA, Paris, France

Filed Jun. 2, 1989, Ser. No. 360,693

Claims priority, application France, Jun. 2, 1988, 88 07337; Dec. 19, 1988, 88 16722; May 24, 1989, 89 06817

Int. Cl.[5] F04B *21/04*; G01F *11/0*

U.S. Cl. 417—552 30 Claims



1. A precompression metering pump for dispensing a liquid or a paste and having improved priming, said pump comprising:

a pump body having a bottom communicating with a tank of said substance and a top open to the atmosphere;

a hollow piston for isolating a pump chamber inside said pump body, and for putting it under pressure, said hollow piston extending via said open top of said pump body in the form of an actuator rod which is pierced from end to end by an outlet channel opening out to a free end of said rod;

a differential piston received in said pump chamber in order to interrupt communication between said tank and said outlet channel; and

a return spring for returning said hollow piston and said differential piston;

wherein the metering pump is further provided with a priming assembly including resilient means and at least one cylindrical part which co-operates with said differential piston and said actuator rod in order to constitute, within said outlet channel, a first outlet non-return valve reserved for dispensing said substance, and a second outlet non-return valve enabling the air initially contained in said pump chamber to be evacuated to the atmosphere, said first non-return valve being closed when said second non-return valve is open, and vice versa.

4,931,000

DOUBLE ACTING DIAPHRAGM AIR PUMP

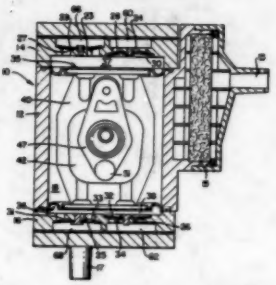
William T. Fleming, Jr., Glen Gardner, N.J., assignor to Gilian Instrument Corp., Wayne, N.J.

Filed Mar. 2, 1989, Ser. No. 318,019

Int. Cl.[5] F04B *43/02*

U.S. Cl. 417—534 5 Claims

1. A double-acting air pump assembly comprising a compact body having walls forming a hollow, substantially enclosed volume, an air intake port, an exit port, a set of valve means mounted on opposite sides of said substantially enclosed volume, a diaphragm assembly for each set of valve means, a plenum chamber formed between each set of valve means and each diaphragm assembly, a yoke supported only by said diaphragm assemblies, and having a solid freely movable framework surrounding a central opening in said body with one end of the framework connected to one diaphragm assembly, and an opposite end of the framework connected to the other diaphragm assembly to provide for rectilinear motion in common with the movement of each diaphragm assembly; a motor mounted upon said pump body and having a rotatable shaft extending into said substantially enclosed volume; an eccentric



connected to said motor shaft for common rotation therewith; yoke driver means connected with a single rotatable connecting point at one end to said solid yoke framework adjacent one of said diaphragm assemblies, and having an opposite end freely suspended in said central opening; and ball bearing means for coupling said yoke driver means to said eccentric within said central opening of said solid yoke.

4,931,001

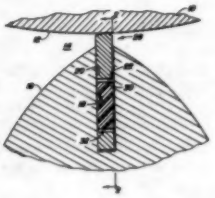
APEX SEAL WITH FILLED APERTURE

Jonathan M. Lauter, Great Neck, N.Y., assignor to Deere & Company, Moline, Ill.

Filed Feb. 13, 1989, Ser. No. 309,509

Int. Cl.[5] F01C *19/04*

U.S. Cl. 418—113 3 Claims



1. In a rotary engine having a housing defining a working surface surrounding a working chamber, and a rotor movable in the working chamber, and having a slot in an apex portion thereof, the slot having radially and axially extending side walls, and an apex seal mounted in the slot for slidably and sealingly engaging the working surface, the apex seal having at least one aperture extending completely therethrough in a circumferential direction to equalize gas pressure on opposite sides of the apex seal, characterized by:

an insert loosely received in the aperture and frictionally engageable with a side wall of the slot.

4,931,002

PYRIDOXAL-5'-PHOSPHATE AS AN IN VITRO ANTICOAGULANT FOR WHOLE BLOOD

Elizabeth H. Kornecki, and Yigal H. Ehrlich, both of S. Burlington, Vt., assignors to The University of Vermont, Burlington, Vt.

Filed May 29, 1987, Ser. No. 55,637
Int. Cl.[5] A61K 35/14, 35/18
U.S. Cl. 424—529 6 Claims

1. In vitro stored whole blood containing pyridoxal-5'-phosphate in a concentration of at least about 4.0 mM, said whole blood retaining platelet activity for at least six (6) hours.

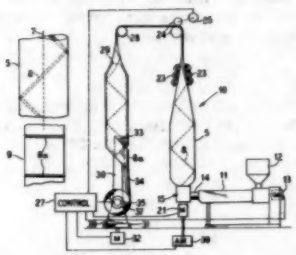
2. A method of preparing whole blood for storage, without loss of platelet activity during said storage, for periods of more than six (6) hours, said method comprising treating the whole blood to be stored by adding pyridoxal-5'-phosphate at a concentration of about 4 mM or greater, thereby reducing the loss of platelet activity during storage.

4,931,003

APPARATUS FOR MAKING BIAXIALLY STRETCHED TUBULARLY EXTENDED FILM WITH TRANSVERSE CLOSURE STRIP

Donald L. VanErden, Wildwood, Ill., assignor to Minigrip, Inc., Orangeburg, N.Y.

Division of Ser. No. 139,970, Dec. 31, 1987, Pat. No. 4,842,907.
This application Jun. 8, 1989, Ser. No. 363,548
The portion of the term of this patent subsequent to Feb. 28, 2006, has been disclaimed.
Int. Cl.[5] B29C 55/26
U.S. Cl. 425—66 5 Claims



1. Apparatus for producing plastic film with transverse closure strips and especially adapted for making bags, comprising:

means for continuously extruding and running a plastic film tube along a given longitudinal axis;

means for joining with a surface of said tube a closure strip means extending helically relative to said tube axis;

means for subjecting the tubular extrusion and the joined closure strip means to axial machine direction draw and also to cross machine diameter-increasing draw, for effecting stretching of the tubular film and for increasing the diameter of the tube, and for corresponding stretching of said closure strip means; and

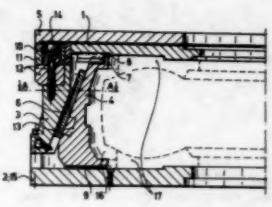
means for controlling both of said draws for attaining a predetermined helix angle of said closure strip means in the increased diameter tube.

4,931,004

FORM CARRIER AND ACTUATING DEVICE FOR THE VULCANIZATION OF TIRES FOR MOTOR VEHICLES

Gábor Fogarasi; Imre Sivó; Gábor Zacsek, and István Zakariás, all of Budapest, Hungary, assignors to Taurus Gumilipari Vallalat, Hungary

Filed Oct. 11, 1988, Ser. No. 255,769
Claims priority, application Hungary, Dec. 16, 1987, 5722/87
Int. Cl.[5] B29C 35/02
U.S. Cl. 425—28.1 10 Claims



1. A form carrier and actuating construction for a vulcanizing machine for rubber tires for motor vehicles comprising: a vertically movable upper part containing a catch-ring connected to the dome of the vulcanizing machine, an upper plate fitting thereto, a locking ring, form-segments defining the upper form-half, while a fixed bottom part includes the base plate and the lower form-half fixed thereto, wherein further form-segments are fixed exchangeably to gliding segments which can be guided askew in guide rails formed on the inner slanted surface of said locking ring and wherein said gliding segments are connected to said upper plate with the insertion of horizontal guide elements and said locking ring and there is a correction ring provided with setscrews and fixing screws for the adjustment of a pre-stress gap between the catch-ring and the upper plate.

4,931,005

APPARATUS FOR THE PRODUCTION OF ELASTIC ABSORBENT

Toyoaki Tanaka, Yokohama; Katuzi Ohira, Sagamihara; Akira Nakamura, Chigasaki; Ryosuke Kamei, and Akihiro Hashimoto, both of Yokohama, all of Japan, assignors to Showa Denko Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 44,373, Apr. 30, 1987, Pat. No. 4,822,668.
This application Jan. 31, 1989, Ser. No. 304,089
Claims priority, application Japan, Jul. 18, 1986, 61-167884; Jul. 31, 1986, 61-178945; Aug. 13, 1986, 61-188698; Dec. 11, 1986, 61-293485; Dec. 22, 1986, 61-303934; Jan. 5, 1987, 62-1; Feb. 13, 1987, 62-29525
Int. Cl.[5] B28B 5/02; D01G 13/00
U.S. Cl. 425—83.1 1 Claim

1. An apparatus for the preparation of an elastic absorbent composed of a mixed web, said apparatus comprises

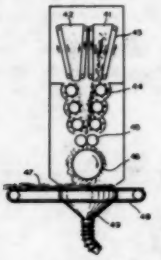
two supply hoppers for separately supplying pulverized pulp and staple fibers of a synthetic fiber split yarn at a constant mixing ratio, each hopper having a pair of confronting moving belts for said supplying,

two guide mechanisms each comprising at least two gear guides disposed below said hoppers for guiding and mixing the supply of the pulverized pulp and staple fibers, said gear guides in each of the guide mechanisms being arranged in series so that the two guide mechanisms confront each other and the distance between the confronting two guide mechanisms downwardly becomes narrower,

a pair of nip rollers disposed below the guide mechanisms to compress the pulverized pulp and staple fibers.

a garnet roll disposed below the pair of the nip rollers to

disintegrate and mix the pulverized pulp and staple fibers, and



a vacuum device disposed below the garnet roll with a mesh belt being interposed therebetween to pull the pulverized pulp and staple fiber mixture onto the mesh belt.

4,931,006

INSTALLATION FOR PRODUCING PACKAGING CONTAINERS

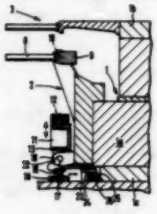
Bernhard Schwyn, Luzern, and Heinrich Ueberegger, Adetswil, both of Switzerland, assignors to KMK Karl Maegerle Lizenz AG, Zug, Switzerland

Filed May 11, 1988, Ser. No. 192,603

Claims priority, application Switzerland, May 13, 1987, 01830/87

Int. Cl.[5] **B28B** *21/70, 21/84;* **B29L** *23/20*

U.S. Cl. 425—412 **12 Claims**



1. An installation for producing packaging containers from prefabricated tube bodies and end portions of thermoplastic material which are connected to the tube bodies in a pressing operation, said installation comprising:

a tube body loading station, a material feed station having a nozzle, and a container unloading station arranged at spacings from each other along a circulatory path;

a plurality of working units movable along said circulatory path;

each said working unit including at least one upwardly directed female mould portion and at least one mandrel pivotable about a horizontal axis between a downwardly directed working position and a loading position;

said at least one female mould portion being arranged in a vertically displaceable housing;

each said working unit further including a frame for supporting said at least one female mould portion, said housing, said at least one mandrel, and actuating means for displacing said at least one female mould portion in said housing and said at least one mandrel relative to each other along a common working axis; and

said at least one female mould portion being movable relative to the circulatory path and said nozzle so as to assume a common axial position with said nozzle.

4,931,007

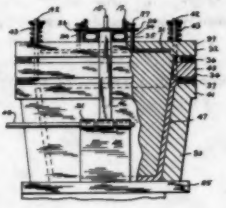
AUTOMATED CASTING APPARATUS

Joseph E. Gold/dalg, Zaragoza, Spain, and Larry G. McKinney, Brownwood, Tex., assignors to Kohler Co., Kohler, Wis.

Filed Jun. 29, 1988, Ser. No. 212,940

Int. Cl.[5] **B28B** *7/32, 13/06*

U.S. Cl. 425—438 **12 Claims**



1. An apparatus for casting a desired item, comprising:

a female mold portion;

a male mold portion for spaced positioning in said female mold portion such that the desired item can be formed therebetween;

release means operatively positioned between said mold portions for releasing the formed desired item;

a holding means including a first fluid means for clamping said female and male mold portions together during a portion of the casting of the desired item;

a first inflatable means operatively positioned and supported between said female mold portion and said release means for separating said female mold portion from said release means; and

a second inflatable means operatively positioned between said release means and said male mold portion for driving said release means against the formed desired item to assist said release means in separating the formed desired item from said male mold portion.

4,931,008

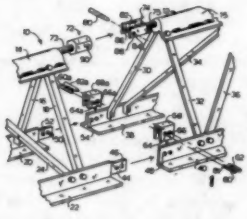
QUICK DISASSEMBLY SCREED CONSTRUCTION

Donald R. Morrison, 9900 Mt. Holly Rd., Charlotte, N.C. 28214

Filed Jan. 4, 1989, Ser. No. 293,458

Int. Cl.[5] **E01C** *19/38;* **B28B** *1/08*

U.S. Cl. 425—456 **6 Claims**



1. A vibrating concrete screed comprising:

(a) an elongate frame having first and second sections each having a top ridge portion and a base portion;

(b) screed blade means mounted on each section base portion adapted to engage and level concrete as the screed is moved over the concrete;

(c) quick disassembly means having one or more removable pins for joining the base portion of one section including the screed blade means thereon to the base portion of the other section including the screed blade means thereon; and

(d) a quickly disassembled turnbuckle assembly made up of two threaded sleeve portions one of which is threadedly engaged with a right handed threaded member extending from the ridge portion of one section and the other sleeve portion is threadedly engaged with a left handed threaded member extending from the ridge portion of the other section and means including a removeable pin for joining one threaded sleeve portion to the other threaded sleeve portion such that when joined the two threaded sleeve portions operatively form a single threaded sleeve and the assembly performs as a single turnbuckle assembly enabling the angle of one screed section relative to the other screed section to be adjusted and when quick disassembly is desired said assembly removeable pin may be removed enabling said threaded sleeve portions to separate to break apart the assembly.

4,931,009

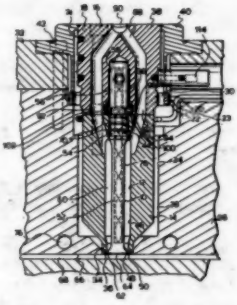
INJECTION MOLDING SYSTEM HAVING A THERMAL LOCATING FLANGE

Jobst U. Gellert, 7A Prince St., Georgetown, Ontario, Canada L7G 2X1

Filed Jun. 12, 1989, Ser. No. 364,311

Int. Cl.[5] B29C *45/23*

U.S. Cl. 425—549 **5 Claims**



1. In a valve gated hot runner injection molding apparatus having a heated nozzle, the heated nozzle having a rear face which is secured against a heated manifold, the nozzle being received in a well having an inner surface in a cooled surrounding cavity plate with an insulative air space extending between the nozzle and the surrounding cavity plate, the manifold and the nozzle having a melt passage extending therethrough to convey pressurized melt to a gate leading to a cavity, the nozzle having sealing and locating means extending into contact with the surrounding cavity plate to prevent leakage of melt from the melt passage into the insulative air space, one of the heated nozzle and the heated manifold having an outwardly extending circumferential locating flange which extends across the insulative air space into contact with the inner surface of the well in the surrounding cavity plate in a position wherein the locating flange is seated against a rearwardly facing circumferential shoulder formed by the inner surface of the well to locate the nozzle in the well, the improvement wherein:

the outwardly extending locating flange which extends across the insulative air space has a plurality of hollow insulative openings extending transversely therethrough to form a first continuous ring of evenly spaced holes extending around the locating flange, whereby the insulative air space between the nozzle, the manifold and the surrounding cavity plate is substantially continuous.

4,931,010

FABRICS HAVING HYDROPHILIC AND HYDROPHOBIC FOAMS

James M. Barnewall, Albany, N.Y., assignor to Albany International Corp., Menands, N.Y.

Filed Oct. 31, 1988, Ser. No. 265,257

Int. Cl.[5] D09H *1/08*

U.S. Cl. 428—282 **4 Claims**

1. A papermaking fabric comprising a press fabric having, on the same surface, at least one hydrophobic foam layer and at least one hydrophilic foam layer.

4,931,011

CONTROL AND METHOD FOR OPERATING A VAPORIZER BURNER

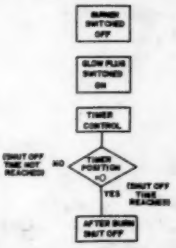
Peter Reiser, and Erich Kenner, both of Esslingen, Fed. Rep. of Germany, assignors to J. Eberspächer, Esslingen, Fed. Rep. of Germany

Filed Mar. 10, 1989, Ser. No. 321,959

Claims priority, application Fed. Rep. of Germany, Apr. 13, 1988, 3812299

Int. Cl.[5] F23N *5/00*; F23Q *7/12*

U.S. Cl. 431—3 **4 Claims**



1. A method of operating a motor vehicle vaporizer burner which has a combustion chamber with a glow plug fitting extending into the combustion chamber and which includes a glow plug in a housing having fibrous material therein and which comprises supplying fuel to the housing of the glow plug to saturate the fibrous material around the glow plug, supplying combustion air to the combustion chamber and supplying current to the glow plug for a predetermined period of time to attain a temperature to effect burning of the fuel in the combustion chamber, sensing the discontinuance of the supply of fuel to the glow plug, again supplying the glow plug with current for a second predetermined period of time to burn off any residual fuel while continuing to supply combustion air to the combustion chamber.

4,931,012

PHASE CONTACTOR/PROCESS FOR GENERATING HIGH TEMPERATURE GASEOUS PHASE

Francois Prudhon, Versailles, France, assignor to Rhone-Poulenc Chimie de Base, Courbevoie, France

Continuation of Ser. No. 948,007, Dec. 31, 1986, abandoned. This application May 9, 1989, Ser. No. 349,922

Claims priority, application France, Jan. 2, 1986, 86 00009

Int. Cl.[5] F23M *9/00*; F23D *14/12*

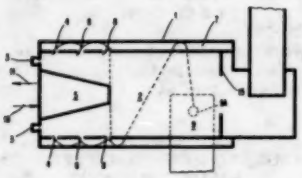
U.S. Cl. 431—9 **14 Claims**

1. A process for bringing into contact at least two compounds in gaseous form prior to reacting said gaseous compounds in a reaction zone, comprising the steps of:

dividing a first gaseous compound by first orifices into a plurality of first separate flowstreams,

dividing a second gaseous compound by second orifices into a plurality of second separate flowstreams,

injecting said first and second flowstreams separately into a mixing chamber containing a rigid central core defined by a longitudinally extending closed wall which closes off an interior of said central core relative to said mixing chamber and said reaction zone,



said first and second flowstreams being separately injected in crossflow relationship within said mixing chamber laterally outside of, and concentrically around, said central core such that said first and second flowstreams intersect and become mixed into complementary elementary unit volumes disposed around said central core upstream of a downstream end of said central core; and

conducting said elementary unit volumes downstream toward said reaction zone.

4,931,013

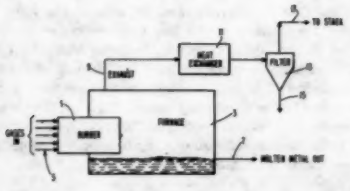
HIGH-TEMPERATURE BURNER

Sudhir R. Brahmbhatt, Macungie, Pa., and Christopher R. Young, San Antonio, Tex., assignors to MG Industries, Valley Forge, Pa.

Filed Jul. 6, 1989, Ser. No. 375,953

Int. Cl.[5] F23C 7/00; C21C 7/00

U.S. Cl. 431—10 **13 Claims**



1. Apparatus for burning a fuel, comprising:

(a) a burner comprising a generally cylindrical housing, the housing having a central longitudinal bore and two annular regions disposed around the bore and being concentric with the bore, one of the annular regions being connected to a supply of fuel, the other annular region being connected to a supply of combustion air, wherein the annular regions and the central bore do not communicate with each other within the housing, and

(b) means for supplying two streams of substantially pure oxygen, one stream being connected to a lance inserted within the central bore, and the other stream being connected a flow line carrying the combustion air, wherein the lance extends beyond the front face of the housing.

4,931,014

BEVELED GLASS CANDLE HOLDER

Edward J. Scott, and Deborah B. Scott, both of 14950 N. 85th Dr., Peoria, Ariz. 85345

Filed Dec. 27, 1988, Ser. No. 290,465

Int. Cl.[5] F23Q 2/32

U.S. Cl. 431—126 **3 Claims**

1. In combination with a support surface, a device for refracting light emanating from a selected point on the device, said device resting on said support surface and including

(a) a container including

(i) a base having an upper surface, and

(ii) an outer transparent wall extending upwardly from said base;

(b) candle means sized to be loosely placed inside said container at a selected position on said upper surface of said base spaced away from said wall and including an outer upright wall circumscribing said candle means;

(c) a stack of randomly oriented transparent light refracting beveled glass prism pieces placed in said container on said base, said beveled glass pieces

(i) circumscribing and in part contacting and bearing against said outer upright wall of said candle means and said wall of said container to maintain said candle means in said selected position on said base and to prevent said candle means from loosely moving over said upper surface of said base,

(ii) extending upwardly from said base and intermediate said candle means and said outer wall of said container, and

(iii) in part, extending above said candle means such that a portion of light emanating upwardly and outwardly from said candle means is refracted through said outer wall through said outer wall of said container by certain of said beveled glass prism pieces extending above said candle means.

4,931,015

MIRROR PARTICULARLY FOR DENTAL CARE WHOSE MOUNTING IS FIXED TO THE HANDLE AND WHOSE GLASS IS REMOVABLE FROM THE MOUNTING WIRE

Daniel Amadei, 18 Route de Cagnes sur Mer, 06610 La Gaude, France

Filed Jul. 26, 1988, Ser. No. 224,397

Claims priority, application France, Jul. 31, 1987, 87 11084

Int. Cl.[5] A61B 1/24

U.S. Cl. 433—30 **6 Claims**

1. Mirror for dental care, comprising a handle, a mounting and a glass or reflective insert, said mounting comprising a split ring receiving the glass or reflective insert and two arms extending from said split ring and defining a slot therebetween, wherein said mounting is nonremovably fixed to said handle,

and wherein said glass or reflective insert is removably mounted in said mounting, whereby a tool may be received in

said slot to pry the glass or reflective insert from said mounting.

4,931,016

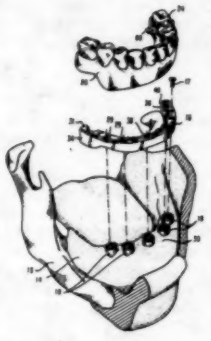
FIXED REMOVABLE DENTAL IMPLANT SYSTEM

Rannar Sillard, 206 Madison Ave., Lakewood, N.J. 08701

Filed Feb. 24, 1989, Ser. No. 314,779

Int. Cl.[5] A61C *13/01*

U.S. Cl. 433—172 **9 Claims**



1. A fixed removable dental implant apparatus, said implant apparatus being secured in a stable position within the mouth, yet removable for cleaning, said implant apparatus comprising:

a plurality of implant pins mounted at predetermined locations in the alveolar bone of the denture wearer, said pins being exteriorly threaded for implant into the alveolar bone.

a support bar generally U-shaped in confiruation and complimentary to the shape of the alveolar bone, said support bar mounted to said pins, said support bar having a plurality of recessed apertures therethrough for receipt of said securing screws to secure said support bar to said implant pins above said gum line;

a supra structure conforming to the configuration of the support bar, having a plurality of detents depending inwardly therefrom to coincide with recessed indents in said support bar for said securing screws, said supra structure having a plurality of guide pins depending inwardly therefrom for alignment of said supra structure with said support bar, the interior of said supra structure conforming to the exterior of said support bar configuration;

a locking means retractable within said supra structure and said support bar for locking said supra structure in firm engagement with said support bar;

an acrylic denture prosthesis mounted on said supra structure, said interior of said supra structure and said exterior of said support bar being complimentary so as to lock said dentures firmly in place in cooperation with said locking means.

4,931,017

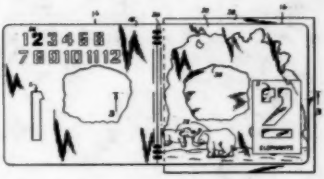
STENCIL BOOK

Philip Mann, Hartsdale, N.Y., assignor to Grosset & Dunlap, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 103,738, Oct. 2, 1987, abandoned, which is a continuation-in-part of Ser. No. 849,530, Apr. 8, 1986, abandoned. This application Mar. 17, 1989, Ser. No. 325,000

Int. Cl.[5] G09B *11/04*

U.S. Cl. 434—87 **13 Claims**



1. A stencil book for children comprising:

a front cover;

a back cover;

a plurality of flat sheets forming a succession of pages between said front cover and said back cover, at least one of said sheets being cut to form a stencil and defining a work page bearing an illustration separate from and related to a concept embodied in said stencil, said front cover, said back cover, and said sheets being formed of a stiff cardboard-like material of substantial thickness;

a tutorial page adjacent to said work page and visible together with said work page when said book is opened to said work page, said tutorial page illustrating the appearance of an image when properly drawn with the aid of said stencil;

a binding means for said covers and sheets forming a hinge for said front cover, said back cover, said work page and said tutorial page and enabling said book to be opened through a full 360° to any of said pages and to lie with both of said covers and all of said pages flat, thereby facilitating use of said book as a stencil book; and

a sheet of paper on which stenciling can be performed, said sheet of paper being insertable beneath said work page so that it is pressed between said work page and an external supporting surface during use of said book as a stencil book.

4,931,018

DEVICE FOR TRAINING WELDERS

Donald J. Herbst, Cape Girardeau; Richard D. Fay, Jackson; David L. Frericks, Jackson, and Bruce A. Blair, Jackson, all of Mo., assignors to Lenco, Inc., St. Louis, Mo.

Filed Dec. 21, 1987, Ser. No. 135,321

Int. Cl.[5] G09B *9/00*

U.S. Cl. 434—234 **34 Claims**

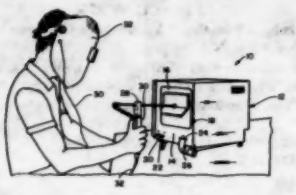
1. A weld simulator comprising

a monitor having a screen on which video images can be produced,

means for generating a set up display on the monitor including set up legends representing different parameters to be simulated and associated sensitive areas, and a simulated welding display representing a simulated welding joint with a welding target to be moved and followed therealong,

a simulated welding tool having a handle portion and a welding tip portion for movement by an operator to posi-

tions adjacent to the displays, the tip portion including first and second distinct sensor means for reacting to selected sensitive areas on the set up display and to the



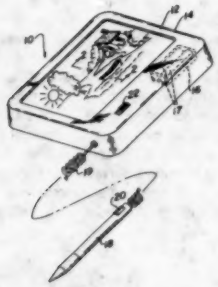
target on the simulated welding display when the tip portion of the tool is moved adjacent thereto to produce changes in the displays and corresponding changes in the simulator functions.

4,931,019

ELECTROSTATIC IMAGE DISPLAY APPARATUS

Kyung T. Park, Berwyn, Pa., assignor to Pennwalt Corporation, Philadelphia, Pa.

Filed Sep. 1, 1988, Ser. No. 239,258
Int. Cl.[5] B43L *1/00*
U.S. Cl. 434—409 **23 Claims**



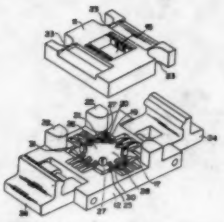
1. An electrostatic image display apparatus comprising:
(a) a housing;
(b) electrode means supported in the housing;
(c) a layer of piezoelectric film parallel to, and separated a distance from, the electrode means arranged such that localized pressure on said layer will product localized electrical charges on said layer;
(d) a suspension medium between the electrode means and the piezoelectric film, the medium containing electrically charged pigmented particles free to move towards said localized electrical charges;
(e) an opening in the housing whereby said localized pressure may be applied to said piezoelectric film; and
(f) means for selectably energizing the electrode means to a preselected electric potential in order to cause said pigmented particles to be removed from said piezoelectric film.

4,931,020

IC PACKAGE POSITIONING DEVICE IN IC SOCKET FOR IC CARRIER

Noriyuki Matsuoka, and Masaaki Kubo, both of Tokyo, Japan, assignors to Yamaichi Electric Mfg. Co., Ltd., Tokyo, Japan

Filed Mar. 8, 1989, Ser. No. 321,198
Claims priority, application Japan, Mar. 8, 1988, 63-54566
Int. Cl.[5] H01R *23/72*
U.S. Cl. 439—72 **5 Claims**



1. An IC socket apparatus for receiving and positioning an IC package which has a plurality of IC leads projecting laterally therefrom and carried in an IC carrier, comprising:
an IC socket having an IC package receiving recess therein and having a plurality of contacts mounted around the periphery of said recess for engaging and contacting leads of an IC package inserted into said recess, said contacts being shiftable in the peripheral direction of said recess, said socket further having guide means thereon for contacting with a guide means on an IC carrier for guiding an IC carrier onto said IC socket with an IC package guided into said recess; and
a guide member in said recess and having a front surface facing toward the opening of said recess and having a plurality of IC package guide portions extending upright from said front surface and spaced for engaging peripheral edge portions of an IC package to be received and positioned in said recess, and having a plurality of contact guide portions on the periphery thereof and defining a plurality of contact engaging grooves between adjacent contact guide portions at positions corresponding to positions of leads on an IC package relative to said guide portions and in which grooves said contacts are engaged, said guide member having the periphery thereof spaced inwardly from the inner peripheral surface of said recess and being movably positioned in said recess for movement laterally to and rotationally around an axis parallel to the direction in which said guide means guides an IC carrier onto said socket;
whereby when an IC carrier carrying an IC package is placed on said IC socket to cause the IC package to move into said recess, the peripheral edge portions of the IC package engage said IC package portions, and if the IC package is shifted relative to said axis or positioned rotationally relative to said axis such that the IC package leads are not aligned with the positions of said contacts, said guide member is shifted for causing said contact guide portions to shift said contacts to positions where they will engage the leads on the IC package.

4,931,021

REVERSIBLE HIGH DENSITY ELECTRICAL CONNECTOR APPARATUS

Paul Mohan, Northville, Mich., assignor to Environmental Research Institute of Michigan, Ann Arbor, Mich.

Filed Jun. 24, 1988, Ser. No. 211,260
Int. Cl.[5] H01R *9/07*
U.S. Cl. 439—285 **10 Claims**

9. A reversible means for mechanically and electrically

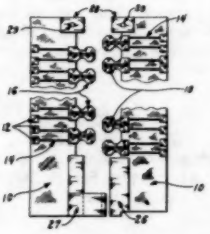
connecting first and second substantially planar arrays of electrical contact sites comprising:

a first flexible support substrate strip (10) having first and second opposed edges;

a plurality of first electrical conductors (14) disposed on said first flexible support substrate strip, each first electrical conductor having a first end (12) disposed at said first opposed edge of said first flexible support substrate strip electrically connected to a corresponding electrical contact site of said first array of electrical contact sites and a second end disposed at said second opposed edge of said first flexible support substrate strip;

a plurality of first interleavable teeth disposed at predetermined intervals along and extending beyond said second opposed edge of said first flexible support substrate strip, each of said plurality of first interleavable teeth including at least one conductive rear portion disposed proximate said second opposed edge of said first flexible support substrate strip, at least one conductive forward section disposed remotely from said second opposed edge of said first flexible support substrate strip and an insulating section (54) disposed perpendicular to said first flexible support substrate strip between said at least one conductive rear portion and said at least one conductive forward portion, each of said at least one conductive rear portions and each of said at least one conductive forward portions connected to the second end of a corresponding one of said plurality of first conductors;

a second flexible support substrate strip (10) having first and second opposed edges;



a plurality of second electrical conductors (14) disposed on said second flexible support substrate strip, each second electrical conductor having a first end (12) disposed at said first opposed edge of said second flexible support substrate strip electrically connected to a corresponding electrical contact site of said second array of electrical contact sites and a second end disposed at said second opposed edge of said second flexible support substrate strip;

a plurality of second interleavable teeth disposed at predetermined intervals along and extending beyond said second opposed edge of said second flexible support substrate strip, each second interleavable tooth including at least one conductive rear portion disposed proximate said second opposed edge of said second flexible support substrate strip, at least one conductive forward section disposed remotely from said second opposed edge of said second flexible support substrate strip and an insulating section (54) disposed perpendicular to said second flexible support substrate strip between said at least one conductive rear portion and said at least one conductive forward portion, each of said at least one conductive rear portions and each of said at least one conductive forward portions connected to the second end of a corresponding one of said plurality of second conductors, said plurality of second interleavable teeth further disposed to interleave with said plurality of first interleavable teeth with each of said at least one conductive rear portion of each of said plurality of first interleavable teeth in electrical contact with a corresponding one of said at least one conductive forward portion of a corresponding one of said plurality of second interleavable teeth and each of said at least one conductive forward portion of each of said plurality of first interleavable teeth in electrical contact with a corresponding one of said at least one conductive rear portion of a corresponding one of said plurality of second interleavable teeth; and

means (24) for reversibly interleaving said plurality of first interleavable teeth with said plurality of second interleavable teeth thereby mechanically connecting said first support base to said second support base and electrically connecting said each first electrical conductor with a corresponding second electrical conductor.

4,931,022

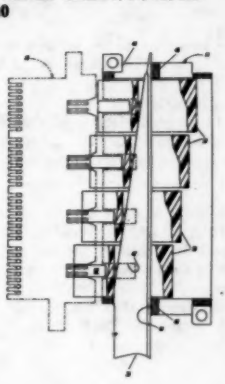
CAM ACTUATED ELECTRICAL CONNECTOR

Douglas A. Neidich, Harrisburg, Pa., assignor to InterCon Systems, Inc., Harrisburg, Pa.

Filed Feb. 24, 1989, Ser. No. 315,123

Int. Cl.[5] H01R *9/07, 13/629*

U.S. Cl. 439—310 **9 Claims**



6. A shuttle assembly for use in a cam actuated electrical connector, comprising a terminal portion at the front of the assembly, terminals in the terminal portion, a cam portion at the rear of the assembly, a cam passage extending transversely through the cam portion and an angled cam follower surface located on a wall of the passage, the surface facing away from the terminal portion, and a ribbon cable having a first portion confined between said terminal and cam portions, a second portion embedded within the cam portion and extending from the confined portion rearwardly past the cam follower surface to the rear of the assembly, and an end extending freely from the assembly.

4,931,023

CORD STRAIN RELIEF DEVICE AND ASSOCIATED LAMP

Alan R. Browne, 4675 Oberlin Way, Marietta, Ga. 30068

Continuation-in-part of Ser. No. 409,406, Sep. 19, 1989. This application Oct. 23, 1989, Ser. No. 425,744

Int. Cl.[5] H01R *13/58*

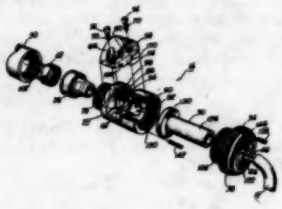
U.S. Cl. 439—459 **10 Claims**

1. A device for securing the position of an elongated object comprising:

a. a lower housing section defining first and second cavities for receiving portions of the object and comprising a first protrusion separating the first and second cavities, which first protrusion is positionable to contact the object at a first point;

b. an upper housing section fastenable to the lower housing section and comprising second and third protrusions, which second and third protrusions are alignable with the first and second cavities, respectively, and are positionable to contact the object at points remote from the first point along the length of the object;

c. a front bushing positionable at least partially within the lower housing section and defining an opening through which the object may pass;



d. a rear cap attachable to the lower housing section and defining an opening through which the object may pass; and

e. a rear bushing comprising:

i. a flanged base positionable within the rear cap; and

ii. a tubular section attached to the flanged base and extendable through the rear cap opening.

4,931,024

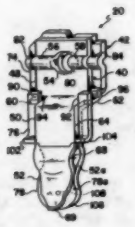
CONTACT CLIP FOR WIRING DEVICES

Albert J. Gartland, Jr., Trumbull, and Michael J. Lawler, Manchester, both of Conn., assignors to Hubbell Incorporated, Orange, Conn.

Filed Sep. 13, 1989, Ser. No. 406,538

Int. Cl.[5] H01R *11/00*

U.S. Cl. 439—856 **16 Claims**



1. An electrical contact clip for a wiring device, comprising:

a first contact member having a first terminal portion adapted to be electrically coupled to wiring, a resilient first contact portion for electrically engaging a mating contact element, and a first intermediate portion extending between said first terminal portion and said first contact portion;

a second contact member having a second terminal portion adapted to be electrically coupled to wiring, a resilient second contact portion for electrically engaging a mating contact element with said first contact portion, and a second intermediate portion extending between said second terminal portion and said second contact portion; and

first and second interlocking means, on said first and second contact members, respectively, for connecting said first and second contact members together adjacent said intermediate portion, such that said contact portions engage and press against each other and are bent about an axis transverse to longitudinal axes of said contact members.

4,931,025

POSTURE CONTROL DEVICE FOR MARINE VESSELS

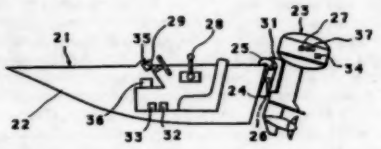
Katsumi Torigai, and Masanori Takahashi, both of Hamamatsu, Japan, assignors to Sanshin Kogyo Kabushiki Kaisha, Shizuoka, Japan

Filed May 26, 1988, Ser. No. 199,245

Claims priority, application Japan, May 29, 1987, 62-134080

Int. Cl.[5] B63H *5/06*

U.S. Cl. 440—1 **13 Claims**



1. In a watercraft having a hull, propulsion means carried by said hull for propelling said hull through a body of water, said propulsion means being supported by said hull for movement through a plurality of trim positions, power means for changing the trim positions of said propulsion means, and means for operating said power means to position said propulsion means at a trim angle to optimize watercraft speed, the improvement comprising means for sensing the posture of the hull and means for changing the operation of said propulsion means in preference to the means for optimizing watercraft speed to maintain stability of the posture of said hull after watercraft speed has been optimized.

4,931,026

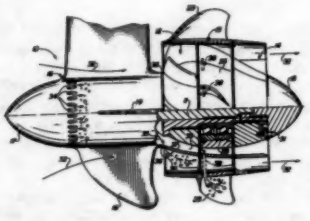
JET PROPELLER

Sylvester L. Woodland, 975 McKinley Dr., Blackfoot, Id. 83221

Filed Apr. 24, 1989, Ser. No. 342,337

Int. Cl.[5] B63H *1/26*

U.S. Cl. 440—38 **8 Claims**



1. A marine propulsion mechanism submergible in water for driving a water craft comprising in combination;

a drive shaft,

means for connecting said drive shaft to an internal combustion engine for rotation thereof,

a first turbine means mounted on said drive shaft for rotation therewith for providing a first high velocity stream of water axially through the propulsion mechanism,

a propeller means journalled on said drive shaft adjacent to and downstream of said first turbine means for rotation independently of said drive shaft,

a second turbine means mounted on said drive shaft adjacent to and downstream of said propeller means for rotation therewith for generating a second high velocity stream of water axially through the propulsion mechanism,

said first and second streams of water causing a further

resulting stream of water for impacting on said propeller means and causing it to rotate in the same direction as, but at a lower rotational velocity then, the rotation of the first and second turbine means,

said resulting stream of water aiding in creating the initial thrust of said propulsion mechanism,

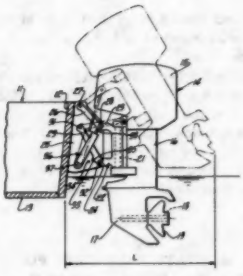
whereby as the speed of said propulsion mechanism increases through the effects of the first and second high velocity streams of water for driving the water craft, the propeller means becomes less effective until it is rendered free wheeling at cruising speeds of the water craft.

4,931,027

TILTING DEVICE FOR OUTBOARD ENGINE

Ryoji Nakahama, and Toshiyuki Yamazaki, both of Iwata, Japan, assignors to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu

Filed Nov. 16, 1984, Ser. No. 672,410
Claims priority, application Japan, Nov. 25, 1983, 58-220808
Int. Cl.[5] B63H *5/12*
U.S. Cl. 440—53 **36 Claims**



1. A mounting arrangement for an outboard drive comprising a drive shaft and a lower unit supporting and driving a propeller shaft carrying a propeller, linkage means adapted to be affixed to an associated watercraft, means connecting said linkage means to said outboard drive for movement of said outboard drive relative to the associated watercraft from a tilted down, driving position through a plurality of trim positions to a tilted up out of the water position, said linkage means being effective to cause said propeller shaft to be raised upon movement from the drive position to the out of the water position and rotated through an angle less than the angle necessary to raise said propeller shaft the same height if said outboard drive were pivoted relative to the watercraft about a fixed pivot axis, said linkage means defining an instant center through said movement positioned close to the upper forward edge of the outboard drive.

4,931,028

TOY BLIMP

Hugh D. Jaeger, 3209 W. 76th St., #207, Minneapolis, Minn. 55435, and James M. Hawley, 4272 Queen Ave. S., Minneapolis, Minn. 55410

Filed Aug. 15, 1988, Ser. No. 232,229
Int. Cl.[5] A63H *27/10*; B64B *1/02*
U.S. Cl. 446—225 **1 Claim**

1. Toy blimp for indoor and outdoor use comprising:

a. means for inflatably holding a gas which is lighter than air;

b. housing fixedly attachable to the outer underside periphery of said inflatably holding means using hook and latch means;

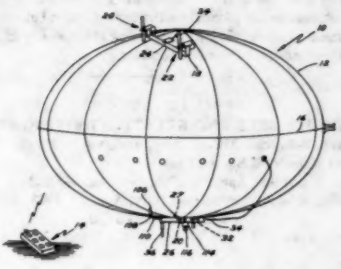
c. battery removably attached within said housing;

d. two spaced electric motors electrically coupled to said battery and mechanically coupled to the periphery of said inflatably holding means using hook and latch means on the outer upperside periphery of said inflatably holding means;

e. propellers mechanically coupled to said electric motors and rotation of said electric motors cause rotation of said propellers and movement of air relative to said inflatably holding means;

f. remote control transmitter for sending control signals;

g. means located within said housing for receiving said control signals;



h. means responsively coupled to said receiving means and said motors for controlling the rotation of said motors in response to said control signals received by said receiving means; and,

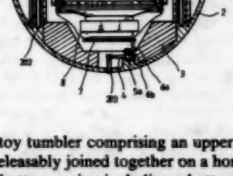
i. means coupled to said housing for releasably holding a supply of ballast to said toy blimp whereby said toy blimp is flyable indoors and outdoors as a free-flying, safe, self-contained toy.

4,931,029

MUSICAL TOY TUMBLER

Long-Shi Hwang, Taichung Hsien, Taiwan, assignor to Kyooh Precision Industry Co., Ltd., Taipei, Taiwan

Filed Mar. 20, 1989, Ser. No. 325,366
Int. Cl.[5] A63H *15/06, 5/00*
U.S. Cl. 446—396 **1 Claim**



1. A musical toy tumbler comprising an upper casing and a bottom casing releasably joined together on a horizontal interface plane; said bottom casing including a bottom wall having an external curvilinear surface that is rounded in every direction whereby the toy tumbler can roll in any direction in response to manual force thereon; said bottom casing having a vertical central axis; an annular weight member seated on said casing bottom wall in concentric relation to the casing central axis, said weight member having an upper face extending generally normal to the casing central axis; internally threaded anchor elements (**202**) extended upwardly from the casing bottom wall at points spaced radially outward from the casing central axis; a cover member (**2***a*) overlying said weight member, said cover member having a number of positioner sleeve elements encircling said anchor elements; said positioner elements having lower ends abutting against the upper face of the weight member; screws (**5***b*) extending through the cover

member into the threaded anchor elements to retain the cover member and weight member in said bottom casing; a hollow receptacle structure extending downwardly from a central point on said cover member for containment of at least one dry cell battery; said hollow receptacle structure comprising a flat wall extending across the casing central axis a slight distance above the weight member; said weight member having a centrally located recess in its upper face; an electronic sound generating speaker (8) located within said recess, said speaker including an upwardly facing horn structure secured to the lower face of said flat wall; said flat wall having at least one opening therethrough for transmitting sonic energy from the speaker; and means located on the casing central axis below the aforementioned speaker for operating the speaker in response to rolling motion of the toy tumbler.

4,931,030

FLEXIBLE BELT AND RELATIVE DRIVING SYSTEM

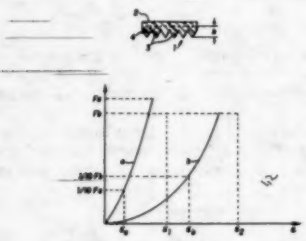
Edoardo Robecchi, Milan, Italy, assignor to Pirelli Transmissioni Industriali S.p.A., Italy

Filed Apr. 27, 1989, Ser. No. 343,723

Claims priority, application Italy, Apr. 27, 1988, 20338 A/88

Int. Cl.[5] F16G *1/10*

U.S. Cl. 474—237 **19 Claims**



1. An elastically extensible belt, comprising:

An annular body made of elastomeric material; and a plurality of elongated elements resistant to tensile stress, embedded in said annular body along a surface substantially corresponding to the position of a neutral axis of said annular body, said belt being bent along a first curvature characterized by a circumference having a radius r_1 equal to 60% of a radius R of a circumferential development of said annular body corresponding to said elongated elements undergoing bending to which derive a first shrinkage value ϵ_1 of a radially innermost surface of said annular body and bent along a second curvature characterized by a circumference having a radius r_2 equal to 35% of said radius R of said circumferential development undergoing bending to which derives a second shrinkage value ϵ_2 of said radially innermost surface, each of said elongated elements, at 1/10 of its ultimate tensile stress, having an elongation value that balances a shrinkage value ranging between said first and said second shrinkage value.

4,931,031

METHOD FOR IMPROVED CONTAINER INTERNAL RAW EDGE PROTECTION

Robert E. Lisiecki, W. Bloomfield, Mich., assignor to Elopak Systems AG, Glattbrugg, Switzerland

Filed Jun. 30, 1989, Ser. No. 373,406

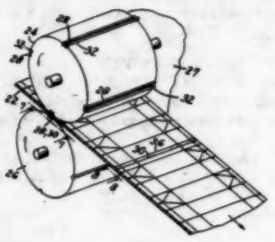
Int. Cl.[5] B31B *1/16, 1/25*

U.S. Cl. 493—355 **4 Claims**

1. A method of skiving the edge of a predetermined panel of container blanks cut from a web of thermoplastic coated paperboard, said method comprising the steps of:

(a) Continuously moving said web of thermoplastic coated paperboard in a longitudinal direction between a pair of spaced apart oppositely rotating rollers;

(b) Forming spaced apart partial cuts and score lines transverse to said longitudinal direction into and across each blank on said web with cutting edges and ribs located at predetermined locations on one of said rollers during the rotation of said rollers while said web is moving therebetween;



(c) Cutting said blanks from said web at predetermined locations with respect to said partial cuts, forming free cut edges thereon; and

(d) Processing individual blanks cut from the web by removing material of approximately one-half the thickness of the blank between the partial cut and the adjacent free cut edge of each blank wherein the score lines are formed parallel to each of said partial cuts a predetermined distance therefrom and intermediate said respective partial cuts and said adjacent free cut edges.

4,931,032

OCTADIENYL ACETATE SYNERGIST FOR THE GRAPE ROOT BORER PHEROMONE

Meyer Schwarz, Kensington; Jerome A. Klun, College Park, both of Md., and J.Wendell Snow, Warner Robins, Ga., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Sep. 22, 1988, Ser. No. 247,547

Int. Cl.[5] A01N *37/02;* A61K *31/22*

U.S. Cl. 514—546 **5 Claims**

1. A composition for attracting the grape root borer, *Vitacea polistiformis* (Harris), comprising the insect pheromone (E,Z)-2,13 octadecadienyl acetate and a synergistically effective amount of (Z,Z)-3,13 octadecadienyl acetate, wherein the ratio of said acetates is in the range of about 99.75:0.25 to 99:1, respectively.

4,931,033

PLASTIC BAG CONSTRUCTION

Dennis Leeds, Edgewood, Ky., assignor to Equitable Bag Co., Inc., Astoria, N.Y.

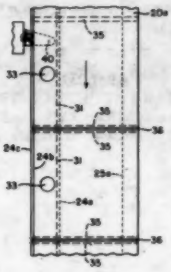
Filed Feb. 1, 1989, Ser. No. 305,295

Int. Cl.[5] B31B *1/64, 49/04, 1/18;* B65D *33/08*

U.S. Cl. 493—195 **2 Claims**

1. A method of making plastic bags in line having reinforced hand holes comprising forming an elongated tube of plastic material with the molecular orientation of the plastic material extending in the longitudinal direction of the tube, forming a longitudinal gusset in the tube to define the upper ends of the bags, said gusset including a pair of foldback reinforcement panels defined between a pair of outer longitudinal fold lines which form the upper ends of the bags and an inner longitudinal fold line which connects inner ends of the foldback reinforcement panels, slitting the inner fold line to open the bags, flattening the tube to form front and back walls of the bags, sealing the longitudinal inner end of each foldback panel to the adjacent wall, while separating the foldback panels to prevent them from being sealed together, punching hand holes in the

reinforced upper ends of the bags, forming transverse seals in the longitudinal webs to form side edges of the bags and separating the bags along the transverse seals, the bags having hand



holes formed in the reinforced upper ends of the bags in which the molecular orientation of the plastic material extends parallel to the upper ends of the bags.

4,931,034

BAGS MADE FROM THERMOPLASTIC SYNTHETIC RESIN SHEETING HAVING CUTOFF WELD SEAMS AND PROCESS FOR PRODUCING THE BAGS

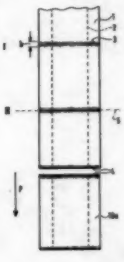
Robert Wagner, Troisdorf-Sieglar, Fed. Rep. of Germany, assignor to Stiegler GmbH Maschinenfabrik, Rudersberg, Fed. Rep. of Germany

Filed Aug. 5, 1988, Ser. No. 228,743

Claims priority, application Fed. Rep. of Germany, Aug. 5, 1987, 3725876

Int. Cl.[5] B31B *1/64*

U.S. Cl. 493—203 **18 Claims**



1. A process for the production of bags from thermoplastic synthetic resin sheeting with a transverse bottom seam fashioned as a cutoff weld seam, which bags are severed by transverse cutoff weld seams from tubular film sheets provided with lateral creases, and which are equipped, in a bottom zone, with obliquely extending corner weld seams arranged separately from each other in two crease portions of the lateral creases, characterized in that a transverse wide flush weld seam is produced by heat contact welding, at a station upstream of a transverse seam cutoff welding of the transverse bottom seam, over the entire width of the tubular film sheet and subsequently a transverse cutoff weld seam is formed within the flush weld seam at another station by heat contact welding and simultaneously severing the flush weld seam.

4,931,035

MAILER WITH OVERSIZED INSERT AND METHOD OF MAKING

Eric Schmidt, Elgin, Ill., assignor to Wallace Computer Services, Inc., Hillside, Ill.

Filed Sep. 15, 1988, Ser. No. 244,727

Int. Cl.[5] B31B *1/10, 1/14, 1/62*

U.S. Cl. 493—216 **4 Claims**

1. A method of mailer manufacture comprising the steps of:

advancing a first web along a longitudinally extending path toward a uniting station,

advancing a second web toward said uniting station and transversely severing the same to provide a series of folded insert plies,

adhesively applying a series of folded insert plies at said uniting station to said first web in longitudinally spaced relation to provide a 3 ply assembly with the fold thereof extending transversely of said path,

severing said first web between each pair of adjacent folded insert plies, and

adhesively securing said assembly between two continuous outer plies which are thereafter adhesively attached to one another, said step of applying said series of folded insert plies including adhering each folded insert ply to said first web along a longitudinally extending line adjacent one edge of each folded insert ply, each ply of said assembly being equipped with longitudinally extending line of perforation adjacent to but spaced inwardly of said line of adhesive.

4,931,036

INTRA-AORTIC BALLOON PUMP

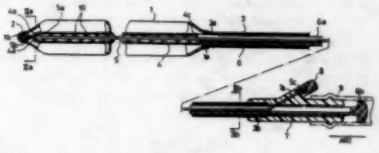
Naritoshi Kanai, Tokyo, and Akira Suzuki, Nishio, both of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Aichi, Japan

Filed Mar. 18, 1988, Ser. No. 170,201

Claims priority, application Japan, Mar. 18, 1987, 62-838

Int. Cl.[5] A61M *29/02*

U.S. Cl. 600—18 **12 Claims**



1. An intra-aortic balloon pump comprising a tube member internally formed with a passage for a drive fluid;

a hollow cylindrical balloon member having two ends, an opening formed at least at one end thereof which is hermetically secured to one end of the tube member;

a support wire having one end which supports the other end of the balloon member and extending axially through the internal space of the balloon member and through the tube member to be held thereby;

a sleeve member disposed in surrounding relationship around the support wire and at least partially formed with a fluid passage, the sleeve member being at least partially displaceable in the axial direction with respect to he sup-

port wire between a position located within the tube member and a position located in the inside of the balloon member;

and braking means formed on at least one of the support wire and the sleeve member to provide a braking action upon movement of the sleeve member when the latter is located at a given position within the balloon member in which said braking means further includes a means for securing the sleeve member in position when it is located at said given position.

4,931,037

IN-DWELLING URETERAL STENT AND INJECTION STENT ASSEMBLY, AND METHOD OF USING SAME

Peter H. Wetterman, Pomfret, Conn., assignor to International Medical, Inc., Danielson, Conn.

Filed Oct. 13, 1988, Ser. No. 257,087
Int. Cl.[5] A61M *37/00, 25/00*
U.S. Cl. 604—8 **17 Claims**

1. An in-dwelling ureteral stent comprising:

(a) a first flexible tubular portion with a straight section and a curled section at the proximal end thereof; and

(b) a second flexible portion providing a tubular curled section at the distal end, said second portion having a larger inner diameter than the outer diameter of said first portion and seating therein the end of said straight section of said first portion, said seated end being bonded to the inner surface of said second portion, whereby the end of said straight section within said section portion forms an internal shoulder facing said distal end within said second portion and against which an injection push catheter may abut, said stent being fabricated from synthetic resin and said second portion having an outer surface which is softer than the outer surface of said first portion.

4,931,038

COMPLEX OF PRODUCTS FOR THE RAPID AND NOT-INVASIVE TREATMENT OF BILIARY CALCULOSIS

Giuliano Frigerio, Milan; Aldo Roda, Bologna, and Enrico Roda, Bologna, all of Italy, assignors to Gipharmex S.p.A., Milan, Italy

Filed Dec. 2, 1987, Ser. No. 127,456
Claims priority, application Italy, Dec. 5, 1986, 22596 A/86
Int. Cl.[5] A61H *23/00*; A61B *17/22*
U.S. Cl. 604—22 **13 Claims**

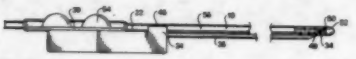
1. A therapeutic system for the rapid and not-invasive treatment of biliary calculosis of cholesterolic nature and accompanying concentrations of calculi, comprising a pharmaceutical composition containing, as its active principle, a biliary acid capable of desaturating bile super-saturated in cholesterol, in combination with a low-power or medium-power ultrasound generating apparatus which generates low-energy or medium energy ultrasounds, said ultrasounds being focused on said calculi concentrations, wherein said combination of said biliary acid and said ultrasound functions to cause the efficient dissolution of said calculi concentrations.

4,931,039

VENTRICULAR CATHETER INTRODUCER

Frederick L. Coe, Santa Barbara, Calif., and Michael E. Lachman, Deerfield, Ill., assignors to Baxter International Inc., Deerfield, Ill.

Filed Oct. 21, 1988, Ser. No. 621,048
Int. Cl.[5] A61M *31/00*
U.S. Cl. 604—53 **21 Claims**



1. An introducer for a catheter, the catheter being flexible and comprising a main portion, a proximal tip and a hole adjacent the proximal tip, the introducer comprising:

a cannula having a tip, a sidewall and an opening in the sidewall adjacent the tip;

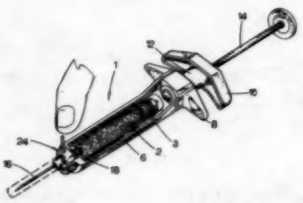
supporting means for supporting the catheter tip, the supporting means comprising a flexible stylet having an end portion, whereupon the stylet being in a first position within the cannula, the end portion of the stylet is adapted to extend through the cannula sidewall opening and into the catheter hole.

4,931,040

SAFETY SYRINGE HAVING A COMBINATION NEEDLE CANNULA AND ARTICULATING HUB FOR RETRACTING SAID CANNULA INTO A MEDICATION CARPULE

Terry M. Haber, Lake Forest, and Clark B. Foster, El Toro, both of Calif., assignors to Habley Medical Technology, Laguna Hills, Calif.

Filed Apr. 13, 1988, Ser. No. 181,204
Int. Cl.[5] A61M *5/00*
U.S. Cl. 604—110 **22 Claims**



22. A syringe assembly including a cylinder having proximal and distal ends, said syringe assembly further including:

a carpule located at the interior of said cylinder and containing a supply of fluid;

a needle cannula communicating with the fluid supply of said carpule and extending outwardly from the distal end of said cylinder so that fluid from said carpule may be injected by way of said cannula;

a needle hub attached to said needle cannula and received at the interior of said carpule for retaining said cannula in fluid communication with said carpule;

means by which to engage said needle hub and to relocate

said hub, and the needle cannula to which said hub is attached, axially and proximally through said carpule so that said cannula is retracted within and completely surrounded by said carpule; and

locking means connected to said carpule to selectively engage said needle hub at the distal end of said cylinder to control the relocation of said hub and the retraction of said cannula, said locking means being moved relative to said hub from a needle retaining position at which to engage said hub and thereby prevent a proximal relocation of said hub and a retraction of said cannula to a needle releasing position at which to release the engagement of said hub and thereby permit a proximal relocation of said hub and a retraction of said cannula.

4,931,041

INFUSION SYRINGE PUMP

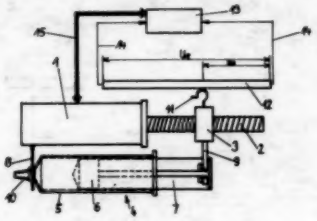
Ulrich Faeser, Kronberg, Fed. Rep. of Germany, assignor to Fresenius AG, Fed. Rep. of Germany

Filed Nov. 15, 1988, Ser. No. 271,975

Claims priority, application Fed. Rep. of Germany, Nov. 22, 1987, 3739563

Int. Cl.[5] A61M *37/00*

U.S. Cl. 604—155 **5 Claims**



1. Infusion syringe pump comprising:

a motor-gear unit and a threaded spindle for driving a linearly movable drive member,

an injection syringe having a syringe plunger which for its actuation is in engagement with the drive member and

a position detecting means for determining the position of the syringe plunger, said means having a position-defining element and a stationary absolute displacement pickup extending along the length of said threaded spindle,

characterized in

that the position-defining element is rigidly connected to the linearly movable drive member, and

that the position-defining element along its path of movement corresponding to the displacement direction of the drive member is electrically coupled to the absolute displacement pickup.

4,931,042

TROCAR ASSEMBLY WITH IMPROVED LATCH

William A. Holmes, Marblehead, and Peter F. Costa, Cambridge, both of Mass., assignors to EndoTherapeutics, Menlo Park, Calif.

Filed Oct. 26, 1987, Ser. No. 113,013

Int. Cl.[5] A61M *5/18*

U.S. Cl. 604—164 **9 Claims**

1. A trocar assembly comprising:

an elongate trocar obturator having a piercing tip at its front end;

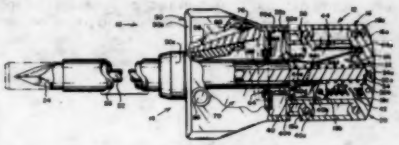
an elongate trocar tube in which said obturator is housed;

a tubular protective shield mounted concentrically around said obturator between a normally extended position in which said obturator tip is covered and a retracted position in which said obturator tip is exposed; and

biasing means acting on said protective shield, whereby said shield is forced to said retracted position to expose said piercing tip when said trocar is being inserted through the wall of a body cavity and is biased by said biasing means to said extended position to shield said piercing tip once said trocar has pierced the wall;

means for preventing said shield from moving from said extended position toward said retracted position;

trigger means coupled to said preventing means and operable between a lock position in which said preventing



means is effective, and a release position for defeating said preventing means and allowing said shield to move from said extended position toward said retracted position, said trigger means being automatically actuable upon application of pressure against said tubular protective shield; and

means for reactivating said preventing means when said shield is returned from said retracted position to said extended position while said trigger means is maintained in said release position.

4,931,043

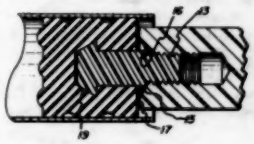
RATCHET CONNECTOR FOR HYPODERMIC SYRINGE PISTONS

Jefferson L. Ray, McPherson, and Michael E. Cooper, Meridian Township, McPherson County, both of Kans., assignors to Sterling Drug Inc., New York, N.Y.

Filed Aug. 8, 1988, Ser. No. 229,394

Int. Cl.[5] A61M *5/00*

U.S. Cl. 604—228 **8 Claims**



1. A device for use in a hypodermic injection system which comprises in combination a slidable piston with a hollow recess therein and connector means for attaching a plunger to said piston, said connector means comprising a pin, said pin being disposed within said hollow recess of said piston, said pin having a cylindrical shank portion, a ratchet head portion on one end thereof of larger overall diameter than said shank portion and a screw-threaded post portion on the other end thereof wherein said ratchet head portion has a plurality of ratchet teeth arranged around its periphery.

4,931,044

BLOOD COLLECTION VALVE

Werner Beiter, Dauchingen, Fed. Rep. of Germany, assignor to Becton, Dickinson and Company, Franklin Lakes, N.J.

Filed Oct. 6, 1988, Ser. No. 254,504

Claims priority, application Fed. Rep. of Germany, Oct. 7, 1987, 3733810

Int. Cl.[5] A61M *5/00*

U.S. Cl. 604—248 **14 Claims**

1. A valve structure for placement between a tube to intro-

duce or take fluid from a vessel and a device to collector or supply fluid to a vessel, comprising;

an input part having a circular passage therethrough aligned along an axis thereof for connection with a tube to introduce or take fluid from a vessel;

a separating wall located across part of the circular passage, the separating wall having an opening therethrough;

an output part configured with a circular surface for insertion into the circular shaped passage when aligned along the axis and the circular surface designed for engagement with while moveable relative to the circular passage;

a structural part on the output part positioned to cooperate with the input part and control axial and rotary movement of the output relative to the input part;

an inner conus passing through the output part, the inner conus shaped to engage with an application conus on a device to collect or supply fluid forming a removable fluid tight connection; and

a valve means operatively and physically associated with the input and output parts and positioned concentric to the axis near where the input and output parts engage one another to connect and disconnect the passage in the input part with the device of the output part, the valve means movably operative relative to the input and output parts and the output part being movable upon engagement of the application conus with inner conus.

4,931,045

LOW PROFILE OSTOMY BAG COUPLING

Peter L. Steer, Surrey, England, assignor to E. R. Squibb and Sons, Inc., Princeton, N.J.

PCT No. PCT/GB87/00885, § 371 Date Jul. 5, 1988, § 102(e) Date Jul. 5, 1988, PCT Pub. No. WO88/04162, PCT Pub. Date Jun. 16, 1988

PCT Filed Dec. 7, 1987, Ser. No. 215,171

Claims priority, application United Kingdom, Dec. 9, 1986, 8629424

Int. Cl.[5] A61F *5/44*

U.S. Cl. 604—338 **5 Claims**

1. A two part ostomy coupling having a first part in the form of a first flat annulus having inner and outer peripheral walls which with the annulus define a shallow channel, and a second part in the form of a second flat annulus having radially inner and outer rims formed by respective flexible peripheral elements of plastics material, the parts being constructed and arranged so that the second part is a parallel push contiguous fit into the shallow channel, said flexible peripheral elements being angled out of the plane of the remainder of the second flat annulus.

4,931,046

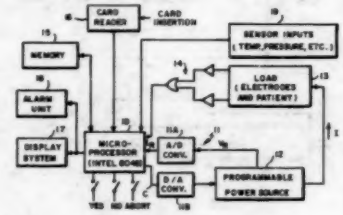
IONTOPHORESIS DRUG DELIVERY SYSTEM

Martin H. Newman, 77 Norwood St., Sharon, Mass. 02067

Continuation of Ser. No. 51,079, May 15, 1987, abandoned. This application Feb. 22, 1989, Ser. No. 314,297

Int. Cl.[5] A61N *1/30*

U.S. Cl. 604—20 **18 Claims**



1. A transdermal medication delivery system comprising

means for retaining a medication in a form such that it is capable of being electrically charged;

means for identifying the medication in said medication retaining means;

means for supplying a d-c electrical current through said medication retaining means at a selected body location of a patient to be treated when said medication is in its electrically charged form, said medication retaining means and said body location forming an electrical current path for causing said medication to be delivered from said medication retaining means to said body location transdermally when said electrical current is so supplied;

current control means for controlling the level of said electrical current in said current path;

said control means, said medication retaining means, said body location, and said electrical current supplying means forming a closed loop during operation whereby said current is supplied in a controlled manner such that said current is generally maintained at a substantially constant level while said medication is being transdermally delivered to said body location and whereby said delivery can be terminated if said current level exceeds a selected maximum allowable level; and

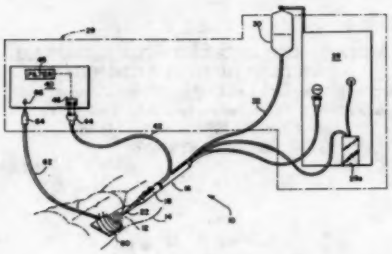
said control means further includes time control means responsive to said medication identifying means and to the substantially constant level of said electrical current for determining the treatment time over which said medication is to be delivered and for automatically terminating the delivery of said medication at the expiration of said treatment time.

4,931,047

METHOD AND APPARATUS FOR PROVIDING ENHANCED TISSUE FRAGMENTATION AND/OR HEMOSTASIS

Alan Broadwin, Brooklyn, N.Y.; Charles Vassallo, Oxford, Conn.; Joseph N. Logan, Trumbull, Conn., and Robert W. Hornlein, Stamford, Conn., assignors to Cavitron, Inc., Stamford, Conn.

Filed Sep. 30, 1987, Ser. No. 103,022
Int. Cl.[5] A61B *17/32, 17/39*
U.S. Cl. 604—22 54 Claims



1. A surgical apparatus for performing one or more surgical procedures at a surgical site on a patient comprising:

a handpiece,

a tool supported by said handpiece,

said tool having a vibratable tool tip,

an RF current means selectively operable for providing an RF current to said tool tip for allowing performance of an electrosurgical procedure at the surgical site,

a vibrating means for ultrasonically vibrating said tool tip,

said tool tip having a top opening,

said tool having a tool passageway therethrough communicating with said tip opening, and

an aspirating means for applying a suction pressure on said tool passageway for aspirating tissue particles and fluid at the surgical site through said tip opening through said tool passageway and away from the surgical site,

said RF current means including a switching means for switching the RF current provided to said tool tip to at least an RF cutting current during ultrasonic vibration.

4,931,048

MEDICAL DEVICE

George A. Lopez, Orange County, Calif., assignor to ICU Medical, Inc., Irvine, Calif.

Continuation of Ser. No. 849,148, Apr. 7, 1986, Pat. No. 4,778,453. This application Oct. 17, 1988, Ser. No. 258,846
Int. Cl.[5] A61M *5/00*
U.S. Cl. 604—110 19 Claims

1. A medical device, comprising:

a needle having first and second ends and a hollow shaft therebetween;

a guard member movable axially along said needle from a first position in which the second end of said needle is exposed, to a second position in which said guard member shields said second end of said needle to prevent needle sticks; and

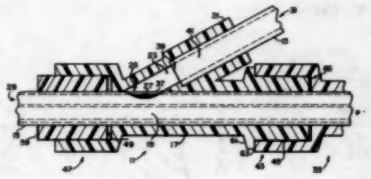
locking means disposed between said first and second ends of said needle for interacting with said guard to permanently lock said guard in said second position upon movement of said guard from said first position.

4,931,049

CATHETER COUPLING SYSTEM

David R. Klimas, Spring Valley, Calif., assignor to Camino Laboratories, Inc., San Diego, Calif.

Filed Jul. 5, 1988, Ser. No. 215,086
Int. Cl.[5] A61M *5/18*
U.S. Cl. 604—165 16 Claims



1. A catheter coupler for coupling a branch catheter to a primary catheter having a plurality of lumens and for establishing a fluid flow path between a lumen in the branch catheter through an orifice in an extremity thereof and a selected one of a plurality of lumens in the primary catheter through an orifice in a side wall thereof, the coupler comprising:

a body for being mounted upon the primary catheter such that the orifice of the side wall of the primary catheter is disposed within the body and the primary catheter extends completely through the body, the body defining longitudinally therethrough a primary passageway sized to mount on the primary catheter in close fitting relationship,

a branch defining therethrough a branch passageway opening into the primary passageway at a junction therebetween at the location of the orifice in the side wall of the primary catheter, and sized to receive the branch catheter in close fitting relationship,

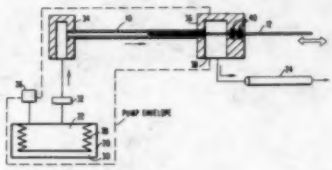
a fluid flow path being thereby established between the lumen in the branch catheter and the selected lumen in the primary catheter when the primary catheter is located in the primary passageway with its orifice adjacent the junction.

4,931,050

CONSTANT PRESSURE VARIABLE FLOW PUMP

Samir F. Idriss, Mattapan, Mass., assignor to Shiley Infusaid Inc., Norwood, Mass.

Filed Apr. 13, 1988, Ser. No. 180,916
Int. Cl.[5] A61M *31/00*
U.S. Cl. 604—891.1 11 Claims



1. An infusion system implantable in the living body comprising:

a constant pressure reservoir for releasing fluid, an outlet conduit connectable to said reservoir,

a flow restriction element inserted into said conduit, said flow restriction element having an axial insertion length (L) of penetration in said conduit and,

means to vary the axial insertion length (L) of said flow

restriction element from a point distant from an implantation site following implantation of said system wherein flow rate characteristics of said outlet conduit are adjusted so that the delivery rate of fluid from said reservoir is altered.

4,931,051

WETNESS INDICATOR

Gregory L. Castello, Gilroy, Calif., assignor to Edge Enterprises, Inc., Gilroy, Calif.

Filed Feb. 6, 1987, Ser. No. 12,110
Int. Cl.[5] A61F *13/16*
U.S. Cl. 604—361 47 Claims

1. An article configured to be worn in intimate contact with a living being near a source of aqueous excretions from the being comprising:

an absorbent layer comprising a water absorbent material in liquid communication with the source; and

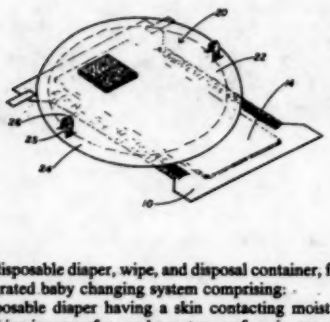
a hydratable salt comprising a transition metal radical, the salt being in liquid communication with the absorbent layer, the salt being characterized by a first color in an unhydrated physical state and the salt being responsive to liquid phase water present in the aqueous excretion absorbed into the absorbent layer for transitioning from the unhydrated physical state to a hydrated physical state characterized by a second color, the salt being present in a concentration sufficient to produce a humanly perceptible color change, the color change occurring independent of the salinity of the excretion.

4,931,052

DIAPER WITH INTEGRAL WIPING CLOTH AND DISPOSAL CONTAINER

Ruth L. Feldman, c/o Dr. Robert Plotkin 28 Brennan Dr., Bryn Mawr, Pa. 19010

Filed Jun. 16, 1989, Ser. No. 369,047
Int. Cl.[5] A61F *13/16*
U.S. Cl. 604—385.1 11 Claims



1. A disposable diaper, wipe, and disposal container, forming an integrated baby changing system comprising:

a disposable diaper having a skin contacting moisture absorbing inner surface and a waterproof environment interfacing outer surface;

a storage container means mounted to the outer surface of said diaper and comprising a liquid impermeable membrane folded so as to define a sealable pocket for retaining a towelette therein in the moistened state until such time as the towelette is needed for wiping the skin, and said pocket adapted to expand and to form a disposal bag for said soiled diaper and the spent towelette; and

a hem proximate the outer peripheral edge of said membrane;

a closure means slidably positioned within said hem for closing said storage container means; and

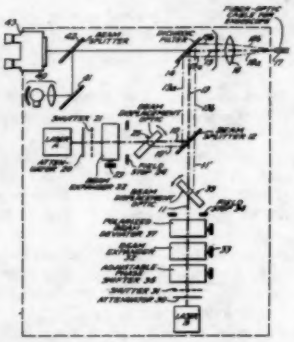
a moist towelette adapted to be stored within said storage container means.

4,931,053

METHOD AND APPARATUS FOR ENHANCED VASCULAR OR OTHER GROWTH

Francis A. L'Esperance, Jr., Englewood, N.J., assignor to L'Esperance Medical Technologies, Inc., New York, N.Y.

Filed Jan. 27, 1988, Ser. No. 148,980
Int. Cl.[5] A61N *5/00*
U.S. Cl. 606—2 44 Claims



1. Apparatus for enhancement of vascular or other tissue growth by laser irradiation of a local area of living body tissue, comprising laser means producing first and second output beams of identical wavelength, means including a beam splitter for combining said beams for coordinated delivery to and interaction with tissue at said local area, and means operable upon one with respect to the other of said beams for determining a phase shift of one with respect to the other of said beams, the combined intensity of beam delivery to said area being in the range up to 150 microwatts/cm^2 and at least sufficient to therapeutically affect beam-impacted body tissue and/or cells but less than sufficient to induce photocoagulation, photovaporization, photonoptical-tissue breakdown, or photoablative decomposition of living tissue and/or cells.

4,931,054

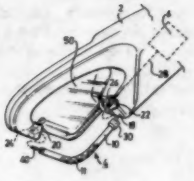
DEVICE FOR REMOVING HAIR

Joseph Gross, Moshav Mazor, Israel, assignor to Hair Remover, Ltd., Tel Aviv, Israel

Filed Sep. 9, 1988, Ser. No. 243,373
Int. Cl.[5] A61B *17/00*
U.S. Cl. 606—43 20 Claims

1. A depilatory device for removing body hair, comprising: a manually-grippable housing, an electric motor within the housing, and a hair-plucker body rotatably mounted to the housing and having an exposed section formed with a plurality of gaps in its outer surface which during the rotation of the hair-plucker body receive, pluck, and eject body hair growing on a surface over which the hair-plucker body is moved; said hair-plucker body being coupled to said motor and being sup-

ported in an arcuate position such that the gaps are open at the convex side of the body during its rotation by the motor to receive the hairs and are closed at the concave side of the body to pluck the hairs; characterized in that the outer face of said housing includes a drive pin of non-circular cross-section coupled to said motor, and a socket spaced from said drive-pin; said hair-plucker body including a collar formed at one side



with a stem received in an axial bore in one end of the hair-plucker body, and formed at the opposite side with a bore of the same non-circular cross-section as said drive pin of the housing for coupling thereto in a quickly attachable-detachable manner, said hair-hair-plucker body including a bearing pin at the opposite end adapted to be received in said socket, thereby permitting said hair-plucker body to be quickly attached to or detached from said housing.

4,931,055

DISTRACTION RODS

John Bumpus, 73 Trobriand Crescent, Glenfield, NSW 2167, and Trevor Woodbridge, 31 Harp Street, South Belmore, NSW 2192, both of Australia

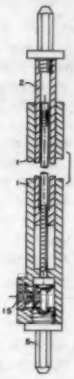
PCT No. PCT/AU87/00160, § 371 Date Jan. 26, 1988, § 102(e) Date Jan. 26, 1988, PCT Pub. No. WO87/07134, PCT Pub. Date Dec. 3, 1987

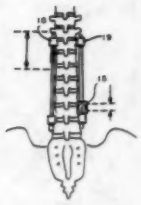
PCT Filed Jun. 1, 1987, Ser. No. 174,998

Int. Cl.[5] A61F *5/04*

U.S. Cl. 606—60 **5 Claims**

1. A distraction rod comprising an elongated member having a threaded, axial bore therein and an elongated housing into which the elongated member is slidably fitted, the elongated housing having located at one end a connection means for fitting to a clamp for connection to the vertebra, and wherein at the other end of the elongated housing a second connection means for fitting to another clamp for connection to the vertebra is located on one end of the elongated member, said elongated housing having operating means which comprises a threaded rod which fits within the bore of the elongated member and engages the threaded bore therein such that the elongated member can move longitudinally along the threaded rod,





and hence longitudinally with respect to said elongated housing.

4,931,056

CATHETER GUIDE APPARATUS FOR PERPENDICULAR INSERTION INTO A CRANIUM ORIFICE

Jamshid B. G. Ghajar; Robert J. Hariri, and Fathali G. Ghadjar, all of New York, N.Y., assignors to Neurodynamics, Inc., New York, N.Y.

Continuation of Ser. No. 93,426, Sep. 4, 1987, Pat. No. 4,821,716. This application Oct. 24, 1988, Ser. No. 261,063

Int. Cl.[5] A61B *19/00*

U.S. Cl. 606—130 **19 Claims**

16. A hand-held apparatus for accurately and reproducibly inserting a catheter through an orifice in a human cranium and guiding said catheter into a ventricle of a human brain, said apparatus comprising:

open tubular means;

support means for said open tubular means, said support means being adapted to rest unsecured on said human cranium in surrounding spaced relation to an orifice therein; and

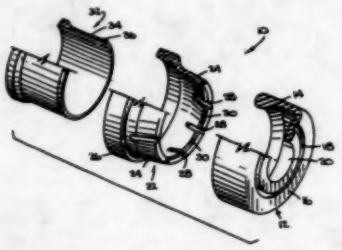
a catheter guide member inserted within said open tubular means and having a diameter larger than that of said catheter and smaller than that of said open tubular means, said catheter guide member including means for positioning and aligning said open tubular means and said support means directly over said cranium orifice; said positioning and aligning means including a forward end thereof adapted to extend partially into said cranium orifice but not into said ventricle, said support means, said open tubular member and said catheter guide member being related to each other and to said cranium so as to guide said catheter through said orifice in a direction perpendicular to an imaginary plane defined by a tangent to the cranium at said orifice.

4,931,057

COMPRESSION ANASTOMOSIS COUPLING ASSEMBLY

Joel W. Cummings, Hazbrouck Heights, N.J., and Ionel E. Teodorescu, Woodside, N.Y., assignors to Pfizer Hospital Products Group, Inc., New York, N.Y.

Filed Mar. 29, 1988, Ser. No. 174,571
Int. Cl.[5] A61B *17/00*
U.S. Cl. 606—153 **26 Claims**



1. An assembly for compression anastomosis of a tubular structure comprising a first, a second and a third coupling member each being generally a hollow open cylinder, said first coupling member being dimensioned and configured to receive therein at least a portion of said second coupling member with said second coupling member being dimensioned and configured to receive therein at least a portion of said third coupling member, and means disposed on said portion of said second coupling member adapted for locking coaction with complementary means disposed proximate a first end of said portion of said third coupling member, with each said coupling member being aligned and urged into engagement, said third coupling member forces said portion of said second coupling member into locking engagement with said first coupling member, with said first end of said third coupling member mechanically locking within said portion of said second coupling member thereby effecting an assembly of interlocking coupling members.

4,931,058

PARALLEL JAW SPRING CLIP AND METHOD OF MAKING SAME

Robert P. Cooper, Yorba Linda, Calif., assignor to Applied Vascular Devices, Inc., Santa Ana, Calif.

Filed Aug. 16, 1989, Ser. No. 394,826
Int. Cl.[5] A61B *17/12*
U.S. Cl. 606—158 **13 Claims**

8. In a parallel jaw spring clip of the type comprising:

(a) inner and outer telescopically interengaged elongate carriers fabricated of a resilient polymeric material, each of said carriers having:

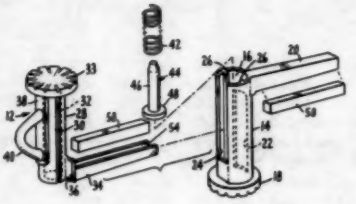
a generally cylindrical side wall;

an elongate passage extending longitudinally thereof, said passage opening through one end of the carrier and being closed by a cap on the end of the carrier opposite said one end;

a jaw element fixed to and extending radially from the side wall of the carrier adjacent said one end thereof;

(b) resilient means to normally bias the inner and outer carriers for telescopic movement relative to one another in a direction forcing the first and second jaw elements toward one another;

an improved method for assembling the carriers into telescopic relationship, comprising:



providing the outer carrier with diametrically aligned slots opening laterally through the side wall thereof, one of said slots having closed ends and being disposed intermediate the cap and the jaw element of the outer carrier, the other of said slots opening through said one end of the outer carrier and terminating in a closed end adjacent the cap of the outer carrier;

passing the inner carrier laterally through said other slot of the outer carrier to direct the jaw element of the inner carrier through the radially aligned slots of the outer carrier and resiliently bias the wall of the outer carrier apart to snap the inner carrier into telescopic engagement with the passage of the outer carrier; and,

simultaneously with the passing of the inner carrier laterally through said other slot of the outer carrier, interposing a compression coil spring between the caps on the ends of the carriers.

4,931,059

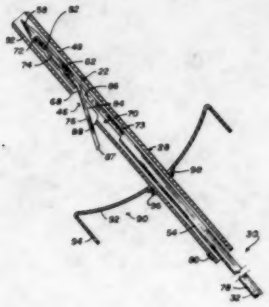
NEEDLE/STYLET COMBINATION

Charles W. Markham, 667 Snug Island, Clearwater, Fla. 34630

Continuation-in-part of Ser. No. 934,332, Nov. 24, 1986, Pat. No. 4,774,948. This application Oct. 3, 1988, Ser. No. 252,740
Int. Cl.[5] A61B *17/34*
U.S. Cl. 606—185 **7 Claims**

1. A needle/stylet combination for use as a marking needle or retraction needle comprising a hollow needle including a barb slot formed in the distal portion thereof, a stylet including a single resilient barb affixed to the distal portion thereof, said stylet and single resilient barb normally disposed within said hollow needle, said single resilient barb including an inclined portion in spaced relationship relative to the distal end of said stylet, said stylet including a channel formed therein to receive the distal end of said single resilient barb and a recess to selectively receive said inclined portion, the axial length from distal end of said stylet to the distal end of said inclined portion being greater than the axial length of said barb slot such that when said single resilient barb is positioned distally relative to said barb slot, said hollow needle houses said single resilient barb and when said stylet is retracted in a distal to proximal direction said inclined portion of said single resilient barb extends outwardly through said barb slot whereby said inclined portion engages the proximal end of said barb slot to retain the

distal end of said stylet within said hollow needle and as said stylet is advanced axially in the proximal to distal direction said



inclined portion of said single resilient barb re-enters said hollow needle.

4,931,060

DEVICE FOR THE INJECTION OF POSTS INTO EAR LOBES

Alfred A. Aué, Nuremberg, Fed. Rep. of Germany, assignor to Wittman GmbH, Fed. Rep. of Germany

Filed Apr. 15, 1988, Ser. No. 182,240

Claims priority, application Fed. Rep. of Germany, May 30, 1987, 3718256; European Pat. Off., Feb. 10, 1988, 88101917.8

Int. Cl.[5] A61B *17/34*

U.S. Cl. 606—188 **16 Claims**

1. A device for the injection of posts into ear lobes comprising:

a barrel;

a grip connected to a first end of said barrel;

a bolt disposed in said barrel which is adapted to be cocked against a spring;

a release lever for releasing the spring;

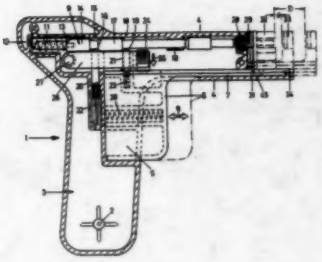
two retaining elements adapted to be releaseably fixed at a second end of said barrel, a first retaining element for receiving a post and a second retaining element for receiving a locking element, said first and second retaining elements being adapted to be positioned at the second end of said barrel such that the post and the locking element are spaced from one another and aligned with one another, said retaining elements having fastening means for the releasable fastening of said first and second retaining elements which support the post and the locking element to said barrel;

wherein the locking element and the post are each adapted to be disposed on said first and second retaining elements and are movable with respect to each other, said first retaining element having a guide recess and said second retaining element having a longitudinally extending bottom part inserted in said guide recess,

wherein the surface of the locking element and the post which are to be oriented towards the ear lobe have a sufficiently small outside distance from each other, such that when in a package and when positioned in the device, the surface of the locking element and the post cannot be touched,

wherein the second retaining element plugs into the first retaining element when inserted into said barrel,

wherein a grip element and a barrel element are placed



adjustably with respect to the grip and the barrel, respectively,

wherein the mounting device for the retaining element for the locking element is disposed on the barrel element and consists of corresponding projections and recesses, wherein the retaining element for the post has a lateral groove for axial engagement of a corresponding undercut at the barrel such that when the grip element is cocked against the force of said spring the retaining element of the post can be inserted in the groove and the projections of the retaining part of the locking element can be inserted in the recesses with a sufficiently small distance of both retaining elements from each other being maintained,

wherein only upon release of the spring tension the retaining elements for the post and the locking element are drawn apart from one another so that the distance between the surface oriented toward the ear lobe is sufficient for an ear lobe to be positioned between them.

4,931,061

PLANT SEED COMPOSITIONS

Donald C. Young, Fullerton, Calif., assignor to Union Oil Company of California, Brea, Calif.

Division of Ser. No. 445,317, Jan. 3, 1983, Pat. No. 4,834,788, which is a continuation-in-part of Ser. No. 442,296, Nov. 17, 1982, abandoned, and a continuation-in-part of Ser. No. 444,667, Nov. 26, 1982, abandoned. This application Mar. 28, 1989, Ser. No. 329,840

Int. Cl.[5] A01C *1/00*

U.S. Cl. 47—57.6 12 Claims

1. A composition of matter comprising a mixture of plant seeds and an aqueous solution comprising urea and sulfuric acid, in which solution the molar ratio of said urea to said sulfuric acid is within the range of about ¼ to about 7/4, and wherein said urea and said sulfuric acid, in combination, constitute at least about 0.5 weight percent of said solution.

4,931,062

HYDROPHOBIZATION OF LEATHER, PELTS AND LEATHER SUBSTITUTE MATERIALS WITH CARBOXYL-CONTAINING POLYSILOXANES

Herbert Bay, Reutlingen; Guenter Eckert, Limburgerhof, and Wolfram Bergold, Heidelberg, all of Fed. Rep. of Germany, assignors to Basf Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Jan. 10, 1989, Ser. No. 295,392

Claims priority, application Fed. Rep. of Germany, Jan. 12, 1988, 3800629

Int. Cl.[5] C14C *5/00, 1/00, 9/00*

U.S. Cl. 8—94.23 6 Claims

1. A process for hydrophobizing leather, a pelt or a leather substitute material with a carboxyl-containing polysiloxane, which comprises treating the leather, pelt or leather substitute material before, during or after retanning with an aqueous liquor which contains a carboxyl-containing polysiloxane in the form of a salt selected from the group consisting of the alkali metal, amine and ammonium salts and has a pH of from 4.0 to 8.0, wherein the salts of the carboxyl-containing polysiloxane have been prepared by neutralizing a polysiloxane selected from the group consisting of the dimethylpolysiloxanes and the methylpropylpolysiloxanes having anhydride numbers of from 0.2 to 1.7 which has terminal carboxylic anhydride groups the salt of the carboxyl-containing polysiloxane being applied in an amount of from 0.1 to 15% by weight, based on the shaved weight of the leather or the wet weight of the pelt or leather substitute material, and then adjusting the pH to from 3.0 to 5.0.

4,931,063

PROCESS FOR THE PRETREATMENT OF SOILED FABRICS

Heinz-Manfred Wilsberg, Cologne; Georg Bosserhoff, Langenfeld; Rolf Puchta, Haan, and Herbert Bücheler, Erkrath, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Continuation of Ser. No. 47,744, May 8, 1987, abandoned. This application Mar. 23, 1989, Ser. No. 328,751

Claims priority, application Fed. Rep. of Germany, May 9, 1986, 3615544

Int. Cl.[5] D06M *1/00*; A47L *11/00*

U.S. Cl. 8—137 5 Claims

1. A process for the pretreatment of a soiled fabric comprising applying to a stained or heavily-soiled part of said fabric from about 2 to about 50 grams of a preparation to from about 2 to about 5 kilograms of said fabric by spreading said preparation in a thin layer on said fabric with a spreading aid trimmed with a plurality bristles, the singular bristle having a triangular cross-section, a length of from about 3 mm to about 30 mm, and a density of from about 40 to about 100 bristles per cm^2 corresponding to a bristle cross-section of from about 1 to about 2 mm^2, said spreading aid surrounding the outlet opening of a tube containing said preparation and being tapered toward the free end of said bristles, said preparation comprising

(a) from about 2 to about 30 parts by weight of at least one nonionic surfactant which is an adduct of ethylene oxide with a fatty alcohol or an oxoalcohol wherein the fatty alcohol or oxoalcohol contains from 12 to 18 carbon atoms and the adduct contains from 3 to 10 moles of ethylene oxide per mole of alcohol,

(b) from about 0.5 to about 10 parts by weight of at least one of:

(i) a quaternary ammonium compound a long-chain C_{10}–C_{20} alkyl or alkenyl group and three C_1–C_4 alkyl groups,

(ii) a fatty amine derivative which is an adduct of 1 to 6 moles of ethylene oxide with 1 mole of a primary fatty amine having a long-chain C_{10}–C_{18} alkyl or alkenyl group,

(iii) a compound of the formula R—NH—CH_2—CH_2—COONa where R is a C_{10}–C_{18} alkyl or alkenyl group,

(c) from about 2 to about 30 parts by weight of at least one activator for per compounds,

(d) from about 2 to about 50 parts by weight of at least one polyhydric alcohol antigel agent,

(e) from about 5 to about 20 parts by weight of at least one viscosity regulator in an amount sufficient to give the detergent composition a viscosity of from about 1000 to about 100,000 mPas, wherein the at least one viscosity regulator is selected from the group consisting of water insoluble zeolites, highly dispersed silica, layer-silicates, water-soluble salts, sugars, polyglycols, and fatty alcohol ethoxylates containing at least about 15 moles of ethylene oxide per mole of fatty alcohol,

(f) from about 0 to 5 parts by weight of at least one heavy metal complexing agent, and, optionally,

(g) a small quantity of a foam regulator, a dye, or both.

4,931,064

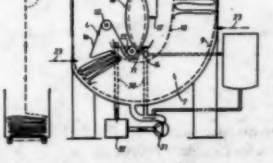
METHOD AND APPARATUS FOR DISCONTINUOUS WET PROCESSING OF KNITTED OR WORKED TEXTILE MATERIAL

Werner Koch, Wald-Michelbach, and Gunther Ruppert, Schwetzingen, both of Fed. Rep. of Germany, assignors to Brueckner-Apparatebau GmbH, Erbach, Fed. Rep. of Germany

Filed Dec. 12, 1988, Ser. No. 283,249

Int. Cl.[5] D06B *3/12*

U.S. Cl. 8—149.1 18 Claims



1. Method of discontinuous wet processing of knitted or worked textile material in which the textile material is circulated continuously in open width in a substantially closed tank, is led through a resting zone defined in the lower region of the tank, through a dipping vat positioned in the central portion of the tank in which treatment liquor is applied to the textile material, and through a reorientation zone defined in the upper region of the tank, characterized by spreading the textile material in the region of the dipping vat, and mechanically purging treatment liquor from the textile material in the region above

the dipping vat to a predetermined residual moisture content and moving the textile material into the resting zone.

4,931,065

AFTERTREATMENT OF REACTIVE DYEINGS ON CELLULOSE FIBERS

Ulrich Baumgarte, Limburgerhof; Rolf Fikentscher; Sigismund Heimann, both of Ludwigshafen; Heinrich Mertens, Frankenthal; Siegfried Schneider, Ludwigshafen, and Michele Vescia, Limburgerhof, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Oct. 21, 1986, Ser. No. 921,111

Claims priority, application Fed. Rep. of Germany, Oct. 22, 1985, 3537458

Int. Cl.[5] D06M *13/34*

U.S. Cl. 8—188 **5 Claims**

1. A process for the aftertreatment of a reactive dyeing on a textile material containing cellulose fibers, in which the dyed textile material is rinsed with water, aftertreated with an aqueous solution of a cationic condensate at from 5° to 100° C. and then rinsed again with water, wherein the cationic condensate used is a watersoluble, quaternized resin which is obtainable

(a) by condensation of methylamine and epichlorohydrin or

(b) by heating triethanolamine and/or triisopropanolamine in the presence of an acidic catalyst

and has been reacted with from 0.25 to 1 mole of benzyl chloride per mole of amine in the condensate.

4,931,066

DYEING COMPOSITION FOR KERATINOUS FIBRES CONTAINING AT LEAST ONE CO-SOLUBILIZED N-SUBSTITUTED 2-NITRO-PARA-PHENYLENEDIAMINE AND PROCESS FOR DYEING KERATINOUS FIBRES THEREWITH

Jean-Francois Grollier, Paris; Jean Cotteret, Francouville, and Georges Rosenbaum, Asnieres, all of France, assignors to L'Oreal, Paris, France

Filed Aug. 9, 1985, Ser. No. 764,074

Claims priority, application Luxembourg, Aug. 13, 1984, 85501

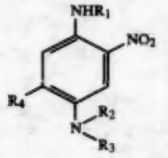
Int. Cl.[5] A61K *7/13*

U.S. Cl. 8—410 **20 Claims**

1. A hair dye composition for living human hair comprising a solution in water, as a cosmetically acceptable vehicle, of

(1) a direct dye selected from the group consisting of

(a) a direct dye having the formula



(I)

wherein

R_1 represents hydrogen, methyl, ethyl or β-hydroxyethyl,

R_2 represents β-hydroxyethyl,

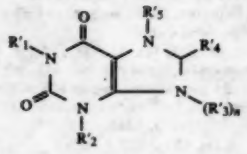
R_3 represents hydrogen, methyl, ethyl or β-hydroxyethyl and

R_4 represents hydrogen, halogen or alkyl having 1–4 carbon atoms, with the proviso that when R_4 is other than hydrogen, R_3 represents hydrogen, and

(b) a salt of the direct dye defined in (a) said direct dye being present in an amount ranging from 0.05 to 5 percent by weight, expressed as free base, based on the total weight of said composition, and

(2) a co-solubilizing amount of a xanthine derivative selected from the group consisting of

(a') a xanthine derivative of the formula



(II)

wherein

n=0 or 1 such that when n=0, represents a double bond and when n=1, represents a single bond,

R_1' and R_2' independently represent hydrogen, alkyl having 1–4 carbon atoms or hydroxyalkyl wherein the alkyl moiety has 2–3 carbon atoms,

R_3' represents hydrogen,

R_4' represents hydrogen, halogen, alkyl having 1–4 carbon atoms, alkoxy having 1–4 carbon atoms or an oxo group when $R_1'=R_2'=R_5'=H$ and n=1; and

R_5' represents hydrogen, alkyl having 1–4 carbon atoms, lower mono- or polyhydroxyalkyl, 3-(2-hydroxyethyl)(methyl)amino-2-hydroxypropyl chain, alkyl having 1–4 carbon atoms and substituted by a heterocycle selected from the group consisting of 1-piperidinoethyl, 1-piperazinoethyl, 4-morpholinomethyl and 4-morpholinoethyl; an acetic or 3-propane sulfonic group; with the proviso that R_1', R_2', R_3', R_4' and R_5' are not all hydrogen simultaneously; and

(b') an inorganic or organic acid salt of the xanthine derivative defined in (a')

said xanthine derivative being present in an amount ranging from 0.1 to 5 percent by weight, expressed as free base, based on the total weight of said composition.

4,931,067

METHOD OR DYEING USING PHASE CHANGE DYESTUFFS

Ronald Swidler, Palo Alto, Calif., assignor to SRI International, Menlo Park, Calif.

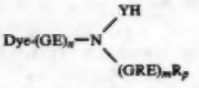
Filed Mar. 27, 1987, Ser. No. 32,068

Int. Cl.[5] D06P *1/04, 1/22, 1/41, 1/42*

U.S. Cl. 8—657 **7 Claims**

1. A method of dyeing a material, comprising:

forming an aqueous a solution having a basic salt of a water soluble dye dissolved therein, said dye having a formula:



wherein:

n is 0 or 1;

m is 0 or 1;

m=1 when n =0;

p=1 when m=0;

the subscripts 1 and 0 indicating, respectively, the presence and absence of the substituent subscripted;

Y is CR_2 COO, CR_2CR_2COO or $CR_2CR_2CR_2COO$;

each R is independently hydrogen, methyl, ethyl, phenyl or phenyl substituted with methyl, ethyl, halo, cyano, ethynyl or nitro;

G is CR, CR_2CR, $CRCR_2$, CR_2CR_2CR, CR_2CRCR_2or $CRCR_2CR_2$;

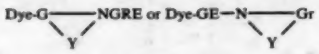
E is OH, SH or NH_2;

when G of GE includes more than one carbon atom the substituent E is attached to a carbon atom selected such that the two end carbon atoms of G are attached, one to the Dye and to the nitrogen; and

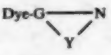
Dye indicates a color imparting dye moiety;

positioning said aqueous solution in contact with a material; and

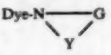
applying sufficient dry heat to said material to converter said dye to a hydrophobic form thereof having the formula:



when n = 1, m = 1 and p = 0;



when n = 1, m = 0 and p = 1; and



when n = 0, m = 1 and p = 0.

4,931,068

METHOD FOR FABRICATING FRACTURE-RESISTANT DIAMOND AND DIAMOND COMPOSITE ARTICLES

John P. Dismukes, Annandale; Michael J. Luton, Summit, and Joseph Vallone, Roselle, all of N.J., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Filed Aug. 29, 1988, Ser. No. 237,360
Int. Cl.[5] B24D *3/00*
U.S. Cl. 51—293 **14 Claims**

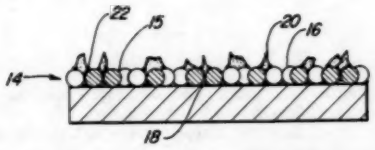
1. A method for consolidating finely divided diamond particles to produce a substantially fully dense article, said method comprising heating a charge including finely divided diamond particles to an elevated compacting temperature, compacting said charge while at said elevated compacting temperature to form said substantially fully dense article, thereafter holding said article at an elevated temperature and time sufficient to rearrange and substantially remove dislocations in said article resulting during said compacting to achieve a substantially strain-free state therein and cooling said article to room temperature.

4,931,069

ABRASIVE TOOL WITH IMPROVED SWARF CLEARANCE AND METHOD OF MAKING

Ronald C. Wiand, 18500 Fairway Dr., Detroit, Mich. 48221

Filed Oct. 30, 1987, Ser. No. 114,928
Int. Cl.[5] B24D *3/08*
U.S. Cl. 51—293 **19 Claims**



10. A method for making an abrasive tool comprising the steps of:

placing a monolayer of abutting discrete elements with intersticial spaces therebetween on a substrate surface with a bonding agent;

treating the layered substrate so as to enable the bonding agent to secure the monolayer to the substrate surface;

coating the monolayer of discrete elements with additional bonding agent;

sprinkling a monolayer of a plurality of elongated abrasive particles onto the monolayer of discrete elements such that end portions of the abrasive particles are positioned in the interstices between discrete elements, each of said abrasive particles being oriented by one of said interstices to have an opposite end portion extending outwardly from said bed; and

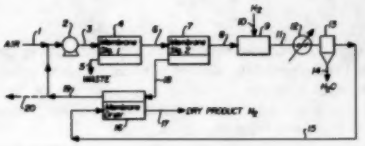
treating the abrasive particle monolayer so as to enable the additional bonding agent to secure the abrasive particles to adjacent discrete elements.

4,931,070

PROCESS AND SYSTEM FOR THE PRODUCTION OF DRY, HIGH PURITY NITROGEN

Ravi Prasad, East Amherst, N.Y., assignor to Union Carbide Corporation, Danbury, Conn.

Filed May 12, 1989, Ser. No. 350,849
Int. Cl.[5] B01D *53/22*
U.S. Cl. 55—16 **23 Claims**



1. An improved process for the production of dry, high purity nitrogen from air in which an air separation membrane system is used to produce purified nitrogen from feed air for passage to a catalytic combustion system for reaction of residual oxygen with hydrogen, the residual wet, high purity nitrogen stream being cooled and passed to condensate removal means prior to drying, the improvement comprising:

(a) passing said wet, high purity nitrogen stream from an air separation membrane system in which it is produced from feed air to a membrane dryer unit capable of selectively permeating water present therein;

(b) recovering dry, high purity nitrogen product gas from the membrane dryer unit as non-permeate gas;

(c) withdrawing water vapor as the permeate gas from the low pressure permeate side of the membrane dryer unit;

(d) passing a relatively dry purge gas to the low pressure permeate side of the membrane dryer unit to facilitate the carrying away of water vapor from the surface of the membrane and maintaining the driving force for removal of water vapor through the membrane from the high purity nitrogen stream for enhanced moisture separation therefrom, said relatively dry purge gas comprising waste gas from said air separation membrane system, feed air of nitrogen product gas, whereby the passage of purge gas on the permeate side of the membrane dryer unit enables the desired moisture removal to be achieved with minimum loss of desired nitrogen product gas.

4,931,071

METHOD FOR DENSELY PACKING MOLECULAR SIEVE ADSORBENT BEDS IN A PSA SYSTEM

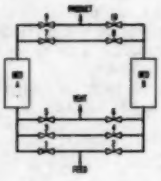
Robert H. Kaplan, New City, N.Y.; Alberto LaCava, South Plainfield, N.J.; Arthur I. Shirley, South Orange, N.J., and Steven M. Ringo, Springtown, N.J., assignors to The BOC Group, Inc., New Providence, N.J.

Filed Mar. 9, 1989, Ser. No. 321,480
The portion of the term of this patent subsequent to Aug. 1, 2006, has been disclaimed.
Int. Cl.[5] B01D *53/04*
U.S. Cl. 55—25 **9 Claims**

1. A process for enriching a gas stream in a primary product gas comprising introducing said gas stream into a pressure swing adsorption system including at least one adsorbent bed containing coarse particles of kinetically-selective molecular

sieve material and from about 10 to 50percent by volume of fine particles of kinetically-selective molecular sieve material wherein the fine particles are greater than 200 mesh and the coarse particles have an average diameter of 1 to 7 mm, and the ratio of the average diameter of the coarse particles to the average diameter of the fine particles is between about 5:1 and 15:1.

5. In a system for enrichment of one or more components of a gas mixture by pressure swing adsorption comprising at least



one adsorbent bed and means to pass the gas mixture through the bed under pressure, said bed containing coarse particles of a kinetically-selective molecular sieve material, the improvement wherein said bed also contains fine particles of kinetically-selective sieve material the fine particles are greater than 200mesh and the coarse particles have an average diameter of 1 to 7 mm, the ratio of the average diameter of the coarse particles to the average diameter of the fine particles is between about 5:1 and about 15:1 and the fine particles comprise from about ten to fifty percent by volume of the bed.

4,931,072

METHOD OF BREAKING FOAM, AND ARRANGEMENT FOR THE SAME

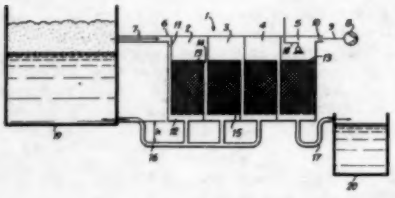
Walter Striedieck, Schwarzenbruck, Fed. Rep. of Germany, assignor to Schering Aktiengesellschaft, Berlin, Fed. Rep. of Germany

Filed Oct. 13, 1988, Ser. No. 257,968

Claims priority, application Fed. Rep. of Germany, Oct. 26, 1987, 3736578

Int. Cl.[5] B01D *19/02*

U.S. Cl. 55—87 **8 Claims**



1. A method for breaking foam, in an installation for set chemical treatment of printed circuit boards and comprising a plurality of stations in which a treatment liquid is sprayed onto a substrate to be treated and thereafter is collected in a supply tank, said method comprising the steps of providing a plurality of serially connected chambers arranged in a side-by-side relationship and containing filling bodies on which foam bubbles burst upon contact therewith; and producing a negative pressure to provide for aspirating of a produced foam from the supply tank and for flow of the foam successively through the plurality of serially connected chambers and separating liquid from the foam.

4,931,073

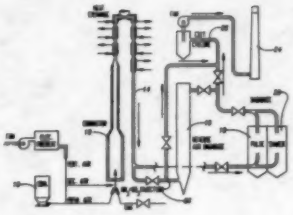
PROCESS OF FLUE GAS CONDITIONING APPLIED TO FABRIC FILTRATION

Stanley J. Miller, and Dennis L. Laudal, both of Grand Forks, N. Dak., assignors to The University of North Dakota School of Engineering & Mines Foundation, Grand Forks, N. Dak.

Filed Jul. 3, 1989, Ser. No. 375,205

Int. Cl.[5] B01D *46/04, 51/10*

U.S. Cl. 55—96 **11 Claims**



1. A method improving control of atmospheric emission of particulate matter from the emission stack of a coal combustion facility which employs baghouse particle controllers said method comprising:

injecting upstream of said baghouse a small but particle conditioning effective amount of ammonia gas and sulfur trioxide gas, with said ammonia being injected upstream of said sulfur trioxide.

4,931,074

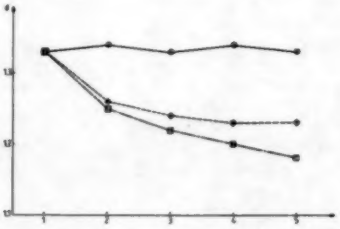
ANTICORROSION COATING COMPOSITION WITH IMPROVED STABILITY, AND COATED SUBSTRATE

Gilbert Marguier, Senlis, France, assignor to Dacral, S.A., France

Filed Jun. 12, 1987, Ser. No. 62,167

Int. Cl.[5] C23C *22/26, 22/32*

U.S. Cl. 148—248 **17 Claims**



1. An anticorrosion coating composition for a metal substrate which comprises:

(a) from approximately 10 to approximately 40% by weight of a particulate metal,

(b) from approximately 1 to approximately 12% by weight of boric acid and hexavalent chromiun,

(c) from approximately 0.5 to approximately 4% by weight of a pH regulator,

(d) from approximately 7 to approximately 30% by weight of a high-boiling solvent of the group consisting of polyols and glycol ethers,

(e) from at least approximately 0.1 to approximately 10% by weight of an organic cosolvent with a solubility parameter of 10.8 ± 1,

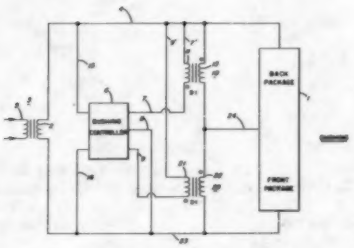
(f) from approximately 0.1 to approximately 10% by weight of mineral spirits

(g) from approximately 1 to approximately 3% by weight of a system of nonionic surfactants comprising at least one water-soluble surfactant which has a HLB close to but higher than 10 and a surfactant which is soluble in mineral spirits which has a HLB close to but lower than 10,
(h) water.

4,931,075
HIGH CURRENT MULTITERMINAL BUSHING CONTROLLER

John J. Kuhn, Gibsonia, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Aug. 7, 1989, Ser. No. 390,054
Int. Cl.[5] C03B *5/02, 37/07*
U.S. Cl. 65—1 **6 Claims**



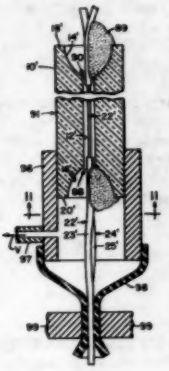
1. In a fiber glass bushing temperature control circuit which is controlling the temperature of two sections of the bushing which and wherein the bushing is producing two forming packages to provide forming packages of uniform weight and which circuit includes a power source, a bushing controller having two variable impedance circuits in shunt with the bushing for each side of the bushing to be controlled which controls the current fed to each section of the bushing to thereby equalize the temperature in each section to maintain the glass fibers uniform in diameter in each side the improvement comprising connecting a transformer between the controller and the bushing in each of the variable impedance shunts in the controller circuit, each transformer being connected in parallel with the secondary winding of the power transformer and also in parallel with the section of the bushing that it controls, the polarity of the secondary windings of these transformers being selected so that the sum of the transformer voltage and the bushing voltage is greater than each of those voltages individually to thereby maximize the current in the variable impedance shunt of the controller.

4,931,076
METHOD OF MAKING FIBER OPTIC COUPLER

George E. Berkey, Pine City, N.Y., assignor to Corning Incorporated, Corning, N.Y.

Continuation-in-part of Ser. No. 82,678, Aug. 7, 1987, abandoned. This application Jun. 9, 1988, Ser. No. 204,620
Int. Cl.[5] C03B *37/10*
U.S. Cl. 65—4.2 **16 Claims**

1. A method of making a fiber optic coupler comprising the steps of:
providing a glass tube having first and second opposite end portions and a midregion, a longitudinal aperture extending from a first end of said tube to a second end thereof,
disposing at least two glass optical fibers, each having a core and cladding, within said longitudinal aperture, said fibers extending beyond each of said ends of said tube,
creating a differential pressure across the wall of said tube whereby the pressure within said aperture is lower than that immediately adjacent the outer surface of said tube,
heating said tube midregion, the combined effect of said pressure differential and said heating causing said midregion to collapse onto said fibers, and



drawing the central portion of said midregion to reduce the diameter thereof and to reduce the distance between the cores of said fibers so that optical signals can be coupled from one of said cores to another of said cores, whereby a drawn down portion is formed.

4,931,077
METHOD OF MANUFACTURING A PLANAR OPTICAL COMPONENT

Johannes H. Angenent, Paris, France; Maritza G. J. Heijman, and Gijsbertus A. C. M. Spierings, both of Eindhoven, Netherlands, assignors to U.S. Philips Corp., New York, N.Y.

Filed Jun. 22, 1988, Ser. No. 210,058
Claims priority, application Netherlands, Jun. 25, 1987, 8701478
Int. Cl.[5] C03C *15/00, 17/245*
U.S. Cl. 65—31 **9 Claims**

1. In a method of manufacturing a planar optical component, in which (1) a metallic mask is applied to a glass substrate and at least one groove is etched in the glass substrate, (2) the substrate is covered with a layer of glass having a refractive index which is higher than that of the substrate glass, the groove being filled entirely with the higher refractive index glass, and (3) etching to remove excess glass, the improvement wherein the metallic mask is not removed before providing the layer of the glass having the high refractive index, the metallic mask serving as a stop layer during the removal of excess glass by etching, and prior to said step (3) etching, the high refractive index glass which has been provided is protected against said step (3) etching at the location of the groove by covering the glass with a protective layer which is applied according to a pattern, and after said step (3) etching step the protective layer and mask are removed and then the higher refractive

index glass at the location of the filled groove is removed down to the level of the substrate by polishing.

4,931,078

WATER TREATING AGENT

Tokuji Yamamoto, Kyoto, Japan, assignor to Kyoritsu Glass Mfg., Co., Ltd., Osaka and Mitsubishi Rayon Engineering Co., Ltd., Tokyo, both of, Japan

Filed Nov. 2, 1987, Ser. No. 116,051
Int. Cl.[5] A01N *25/00*
U.S. Cl. 71—67 **12 Claims**

6. A method for treating water, comprising contacting water with a microbicide water treating agent, comprising a water soluble glass containing monovalent silver ions in the form of silver oxide, wherein said water soluble glass comprises a glass component consisting essentially of a network forming oxide containing a combination of B_2O_3 and at least one member selected from the group consisting of SiO_2 and P_2O_5; and a network modifying oxide composed of at least one member selected from the group consisting of Na_2O, K_2O, CaO, MgO, BaO, ZnO, and Li_2O.

4,931,079

SCARIFYING PLANT SEEDS

Donald C. Young, Fullerton, Calif., assignor to Union Oil Company of California, Brea, Calif.

Division of Ser. No. 455,317, Jan. 3, 1983, Pat. No. 4,834,788, which is a continuation-in-part of Ser. No. 422,296, Nov. 17, 1982, abandoned, and a continuation-in-part of Ser. No. 444,667, Nov. 26, 1982, abandoned, and a continuation-in-part of Ser. No. 453,282, Dec. 27, 1982, abandoned, and a continuation-in-part of Ser. No. 453,496, Dec. 27, 1982, abandoned. This application Mar. 28, 1989, Ser. No. 329,644
Int. Cl.[5] A01N *47/28, 59/02*
U.S. Cl. 71—77 **15 Claims**

1. A method for scarifying plant seeds, which method comprises the step of contacting said plant seeds with an aqueous solution containing urea and sulfuric acid in which the molar ratio of said urea to said sulfuric acid is within the range of $\frac{1}{4}$ to about 7/4.

4,931,080

SOLID, PHYTOACTIVE COMPOSITIONS, METHODS OF USE AND METHODS OF PREPARATION

Jimmy H. Chan, 5331 Alhambra Valley Rd., Martinez, Calif. 94553, and Roger R. Djafar, One Seamast Passage, Corte Madera, Calif. 94925

Continuation-in-part of Ser. No. 50,455, May 18, 1987, abandoned, which is a continuation of Ser. No. 762,466, Aug. 5, 1985, abandoned, which is a continuation-in-part of Ser. No. 738,708, May 29, 1985, abandoned. This application Jan. 19, 1988, Ser. No. 145,152
Int. Cl.[5] A01N *25/00*
U.S. Cl. 71—87 **26 Claims**

1. A solid, substantially non-hygroscopic, phutoactive composition comprising an intimate mixture of a phytoactive N-phosphonomethyl-N-carboxymethyl compound and a surfactant, where the surfactant is solid at ambient temperature and said phytoactive N-phosphonomethyl-N-carboxymethyl compound is dispersed throughout a matrix formed by said surfactant.

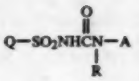
4,931,081

HERBICIDAL DIAZOLES SULFONAMIDES

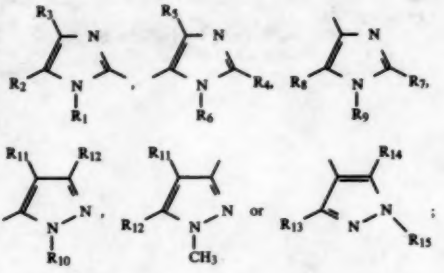
Anthony D. Wolf, Elkton, Md., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 384,043, Jun. 1, 1982, abandoned. This application Apr. 25, 1983, Ser. No. 486,092
Int. Cl.[5] A01N *43/36, 43/40*; C07D *239/42, 239/47*
U.S. Cl. 71—92 **82 Claims**

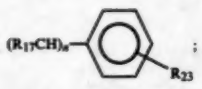
1. A compound of the formula:



where
R is H or CH_3;
Q is

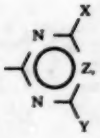


R_1 is H, C_1–C_8 alkyl, C_3–C_6 alkenyl, C_5–C_6 cycloalkyl, C_5–C_6 cycloalkenyl, C_3–C_6 alkynyl, C_4–C_7 cycloalkylalkyl, $(R_{17}CH)_nC(O)R_{16}$, $(R_{17}CH)_nCO_2R_{18}$, $(R_{17}CH)_nCOSR_{19}$, $(R_{17}CH)_nCONR_{20}R_{21}$, $(R_{17}CH)_nSO_2NR_{20}R_{21}$, $(R_{17}CH)_nSO_2R_{22}$,



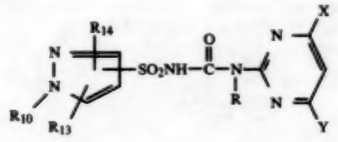
or C_1–C_6 alkyl substituted either with
(a) 1–3 atoms of F, Br or Cl; or
(b) OR_{16};
provided that,
(1) the total number of carbon atoms in R_1 is less than or equal to 8; and
(2) if R_1 is other than C_1–C_3 alkyl, then R_3 must be H;
R_2, R_3 and R_4 are independently H or CH_3;
R_5 is H, C_1–C_4 alkyl, —OR_6, NO_2, F, Cl, Br, CO_2R_{24}, $S(O)_mR_{25}$ or $SO_2NR_{20}R_{21}$;
R_6 is H, C_1–C_4 alkyl, C_3–C_4 alkenyl, C_3–C_4 alkynyl, CO_2R_{18}, $SO_2NR_{20}R_{21}$, SO_2R_{22} or C_1–C_4 alkyl substituted with (a) 1–3 atoms of F, Cl or Br; or (b) OCH_3;
provided that,
(1) when R_5 is other than H, CH_3, OCH_3 or NO_2, then R_6 is H or CH_3; and
(2) when R_6 is CO_2R_{18}, $SO_2NR_{20}R_{21}$ or SO_2R_{22}, then R_5 is H, CH_3, OCH_3 or NO_2;
R_7 is H or CH_3;
R_8 is H, C_1–C_4 alkyl, —OR_{16}, NO_2, F, Cl, Br, CO_2R_{24}, $S(O)_mR_{25}$ or $SO_2NR_{20}R_{21}$;
R_9 is CH_3 or C_2H_5;
R_{10} is H, C_1–C_4 alkyl, C_3–C_4 alkenyl, C_3–C_4 alkynyl, CO_2R_{24}, $SO_2NR_{20}R_{21}$ or SO_2R_{22};
R_{11} is H, C_1–C_3 alkyl, F, Cl, Br, NO_2, —OR_{16}, CO_2R_{24}, $S(O)_mR_{25}$ or $SO_2NR_{20}R_{21}$; provided that, when R_{10} is other than C_1–C_3 alkyl, then R_{11} is H, Cl, OCH_3, NO_2 or CH_3;
R_{12} is H or CH_3;
R_{13} and R_{14} are independently H, C_1–C_3 alkyl —OR_{16}, F, Cl, Br, NO_2, CO_2R_{24}, $S(O)_mR_{25}$ or $SO_2NR_{20}R_{21}$; provided that, when either of R_{13} or R_{14} is CO_2R_{24}, $S(O)_mR_{25}$ or $SO_2NR_{20}R_{21}$, then the other is H, Cl, CH_3, OCH_3 or NO_2;
R_{15} is H or CH_3;

R_{16} is C_1–C_3 alkyl;
R_{17} is H or CH_3;
R_{18} is C_1–C_4 alkyl, C_3–C_4 alkenyl, C_3–C_4 alkynyl, CH_2CH_2Cl or $CH_2CH_2OCH_3$;
R_{19} is C_1–C_4 alkyl, C_3–C_4 alkenyl, C_3–C_4 alkynyl or $CH_2CH_2OCH_3$;
R_{20} and R_{21} are independently CH_3 or C_2H_5;
R_{22} is C_1–C_3 alkyl or CF_3;
R_{23} is H, Cl, Br, CH_3, F, CF_3, OCH_3 or NO_2;
R_{24} is C_1–C_3 alkyl or allyl;
R_{25} is C_1–C_3 alkyl;
m is 0, 1 or 2;
n is 0 or 1;
A is



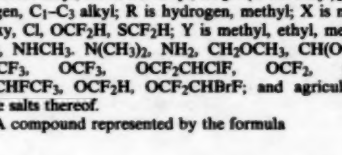
X is CH_3, OCH_3, Cl, F, OCF_2H or SCF_2H;
Y is CH_3, C_2H_5, OCH_3, OC_2H_5, CH_2OCH_3, $CH(OCH_3)_2$, OCH_2CF_3, OCF_3, NH_2, $NHCH_3$, $N(CH_3)_2$ or GCF_2T where G is O or S and T is H, CHClF, CHBrF, CF_2H or $CHFCF_3$;
Z is CH;
Y_1 is H, Cl, CH_3, OCH_3 or OCF_2H;
X_2 is OCH_3, CH_3, CH_2CH_3, OCH_2CH_3, SCH_3 or SCH_2CH_3;
Y_2 is CH_3, CH_2CH_3 or CH_2CF_3;
X_3 is OCH_3 or CH_3;
provided that,
when X is Cl or F, then Z is CH and Y is OCH_3, NH_2, $NHCH_3$ or $N(CH_3)_2$;
and agriculturally suitable salts thereof.

59. A compound represented by the formula



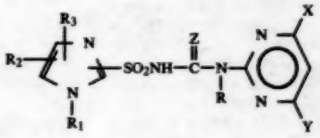
wherein R_{10} is hydrogen, C_1–C_4 alkyl, C_3–C_4 alkenyl, C_3–C_4 alkynyl, CO_2-lower alkyl, CO_2 allyl, SO_2N (lower alkyl)$_2$, SO_2NH lower alkyl, SO_2CF_3; R_{13} is hydrogen, C_1–C_3 alkyl, halo, NO_2, lower alkoxy, CO_2-lower alkyl, CO_2-lower alkenyl, S-lower alkyl, SO-lower alkyl, SO_2N (lower alkyl)$_2$; R_{14} is hydrogen, C_1–C_3 alkyl; R is hydrogen, methyl; X is methyl, methoxy, Cl, OCF_2H, SCF_2H; Y is methyl, ethyl, methoxy, ethoxy, $NHCH_3$. $N(CH_3)_2$, NH_2, CH_2OCH_3, $CH(OCH_3)_2$, OCH_2CF_3, OCF_3, OCF_2CHClF, OCF_2, CF_2H, OCF_2CHFCF_3, OCF_2H, OCF_2CHBrF; and agriculturally suitable salts thereof.

62. A compound represented by the formula

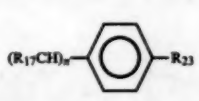


wherein R is H or CH_3; X is CH_3, OCH_3, Cl, F, OCF_2H or SCF_2H; Y is CH_3, C_2H_5, OCH_3, OC_2H_5, CH_2OCH_3, $CH(OCH_3)_2$, OCH_2F_3, OCF_3, NH_2, $NHCH_3$, $N(CH_3)_2$ or GCF_2T where G is O or S and T is H, CHClF, CHBrF, CF_2H or $CHFCF_3$; R_{10} is hydrogen, C_1–C_4 alkyl, C_3–C_4 alkenyl, C_3–C_4 alkynyl, CO_2 C_1–C_3 alkyl, CO_2 allyl, $SO_2N(CH_3)_2$, $SO_2N(C_2H_5)_2$, $SO_2N(CH_3)C_2H_5$, SO_2 C_1–C_3 alkyl, SO_2CF_3; and R_{13} and R_{14} independently are hydrogen, C_1–C_3 alkyl, F, Cl, Br, NO_2, C_1–C_3 alkoxy, CO_2 C_1–C_3 alkyl, CO_2 allyl, SC_1–C_3 alkyl, SO C_1–C_3 alkyl, SO_2 C_1–C_3 alkyl, $SO_2N(CH_3)_2$, $SO_2N(CH_3)C_2H_5$, or $SO_2N(C_2H_5)_2$; provided that when either of R_{13} or R_{14} is CO_2 C_1–C_3 alkyl, CO_2 allyl, SC_1–C_3 alkyl, SO C_1–C_3 alkyl, SO_2 C_1–C_3 alkyl, $SO_2N(CH_3)_2$, $SO_2N(CH_3)C_2H_5$, $SO_2N(C_2H_5)_2$, then the other is hydrogen, Cl, CH_3, OCH_3 or NO_2, and agriculturally suitable salts thereof.

65. A compound represented by the formula

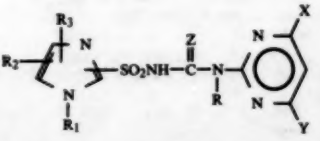


wherein
Z is O or S;
R is H or CH_3;
R_1 is H, C_1–C_8 alkyl, C_3–C_6 alkenyl, C_5–C_6 cycloalkyl, C_5–C_6 cycloalkenyl, C_3–C_6 alkynyl, C_4–C_7 cycloalkylalkyl, $(R_{17}CH)_mC(O)C_1$–C_3 alkyl, $(R_{17}CH)_nCO_2R_{18}$, $(R_{17}CH)_mCOSR_{19}$, $(R_{17}CH)_nCON(C_1$–C_2 alkyl)$_2$, $(R_{17}CH)_nSO_2R_{22}$,



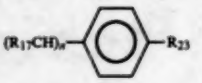
or C_1–C_6 alkyl substituted either with
(a) 1–3 atoms of F, Br or Cl; or
(b) $O(C_1$–C_3 alkyl);
R_{17} is H or CH_3;
R_{18} is C_1–C_4 alkyl, C_3–C_4 alkenyl, C_3–C_4 alkynyl, C_3–C_4 alkynyl, CH_2CH_2Cl or $CH_2CH_2OCH_3$;
R_{19} is C_1–C_4 alkyl, C_3–C_4 alkenyl, C_3–C_4 alkynyl or $CH_2CH_2OCH_3$;
R_{22} is CH_3, C_2H_5;
R_{23} is H, Cl, Br, CH_3, F, CF_3, OCH_3 or NO_2;
R_2 is H or CH_3;
R_3 is H, C_1–C_4 alkyl, C_3–C_4 alkenyl, C_3–C_4 alkynyl, CO_2R_{18}, $S(O)_m(C_1$–C_3 alkyl), $SO_2N(C_1$–C_2 alkyl)$_2$, SO_2R_{22} or C_1–C_4 alkyl substituted either with
(a) 1–3 atoms of F, Cl or Br, or
(b) OCH_3;
n is 0 or 1;
m is 0, 1 or 2;
X is CH_3, OCH_3, Cl, OCF_2H, SCF_2H;
Y is CH_3, C_2H_5, OCH_3, OC_2H_5, CH_2OCH_3, $CH(OCH_3)_2$, OCH_2F_3, OCF_3, NH_2, $NH(CH)_2$ or GCF_2T where G is O or S and T is H, CHClF, CHBrF, CF_2H or $CHFCF_3$; and agriculturally suitable salts thereof.

68. A compound represented by the formula



and agriculturally suitable salts thereof; wherein

Z is O;
R is H or CH_3;
R_1 is H, C_1–C_8 alkyl, C_3–C_6 alkenyl, C_5–C_6 cycloalkyl, C_5–C_6 cycloalkenyl, C_3–C_6 alkynyl, C_4–C_7 cycloalkylalkyl, $(R_{17}CH)_nC(O)C_1$–C_3 alkyl, $(R_{17}CH)_nCO_2R_{18}$, $(R_{17}CH)_nCOSR_{19}$, $(R_{17}CH)_nCONR_{20}R_{21}$, $(R_{17}CH)_nSO_2NR_{20}R_{21}$, $(R_{17}CH)_nSO_2R_{22}$,



or C_1–C_6 alkyl substituted either with
(a) 1–3 atoms of F, Br or Cl; or
(b) $O(C_1$–C_3 alkyl); provided that (1) the total number of carbon atoms in R_1 are less than or equal to 8; and (2) when the sulfonylurea bridge is in the 2-position and R_1 is other than C_1–C_3 alkyl, then R_3 must be H;
R_{17} is H or CH_3;
R_{18} is C_1–C_4 alkyl, C_3–C_4 alkenyl, C_3–C_4 alkynyl, CH_2CH_2Cl or $CH_2CH_2OCH_3$;
R_{19} is C_1–C_4 alkyl, C_3–C_4 alkenyl, C_3–C_4 alkynyl or $CH_2CH_2OCH_3$;
R_{20} and R_{21} are independently CH_3 or C_2H_5;
R_{22} is C_1–C_3 alkyl or CF_3;
R_{23} is H, Cl, Br, CH_3, F, CF_3, OCH_3 or NO_2;
R_{24} is C_1–C_3 alkyl or allyl;
R_2 is H or CH_3;
R_3 is H or CH_3, C_1–C_4 alkyl, OR_6, NO_2, F, Cl, Br, CO_2R_{24}, $S(O)_m(C_1$–C_3 alkyl) or $SO_2NR_{20}R_{21}$;
n is 0 or 1;
m is 0, 1 or 2;
X is CH_3, OCH_3, Cl, F, OCF_2H, SCF_2H;
Y is CH_3, C_2H_5, OCH_3, OC_2H_5, CH_2OCH_3, $CH(OCH_3)_2$, OCH_2F_3, OCF_3, NH_2, $NHCH_3$, $N(CH_3)_2$ or GCF_2T where G is O or S and T is H, CHClF, CHBrF, CF_2H or $CHFCF_3$; provided that
(1) when the sulfonylurea bridge is at the 2-position, then R_3 is H or CH_3;
(2) when the sulfonylurea bridge is at the 5-position, then R_2 is at the 2-position and R_1 is H, C_1–C_4 alkyl, C_3–C_4 alkenyl, C_3–C_4 alkynyl, CO_2R_{18}, $SO_2NR_{20}R_{21}$, SO_2R_{22} or C_1–C_4 alkyl substituted with (a) 1–3 atoms of F, Cl or Br, or (b) OCH_3;
(3) when the sulfonylurea bridge is at the 4-position, then R_2 is at the 2-position, R_1 is CH_3 or C_2H_5, and R_3 is H, C_1–C_4 alkyl, OR_{16}, NO_2, F, Cl, Br, CO_2R_{24}, $S(O)_mR_{25}$ or $SO_2NR_{20}R_{21}$;
(4) when the sulfonylurea bridge is at the 5-position and R_3 is other than H, CH_3, OCH_3 or NO_2, then R_1 is H or CH_3; and
(5) when the sulfonylurea bridge is at the 5-position and R_1 is CO_2R_{18}, $SO_2NR_{20}R_{21}$ or SO_2R_{22}, then R_3 is H, CH_3, OCH_3 or NO_2.
(6) when X is Cl or F, then Y is OCH_3, NH_2, $NHCH_3$ or $N(CH_3)_2$.

4,931,082

TRIAZOLE DERIVATIVES USEFUL AS PLANT GROWTH REGULATING AGENTS

Raymond Elliott, Near Reading, England, assignor to Imperial Chemical Industries PLC, London, England

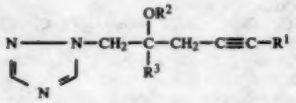
Filed Nov. 25, 1986, Ser. No. 936,719

Claims priority, application United Kingdom, Dec. 10, 1985, 8530429

Int. Cl.[5] **A01N** *43/653;* **C07D** *249/08*

U.S. Cl. 71—92 **7 Claims**

1. A triazole having the formula (I):



and stereoisomers thereof, wherein R^1 is a branched or straight chain alkyl group containing from 3 to 5 carbon atoms or a haloalkyl group containing from 2 to 4 carbon atoms or a group $—(CH_2)_n—R^4$ where n is from 0 to 2 and R^4 is cyclopropyl, cyclobutyl, cyclopentyl or cyclohexyl; R^2 is hydrogen, an alkyl group containing from 1 to 4 carbon atoms, an alkenyl group containing from 2 to 4 carbon atoms, an alkynyl group containing from 2 to 4 carbon atoms, an alkynyl group containing from 2 to 4 carbon atoms or a benzyl group; and R^3 is a tertiary butyl group optionally substituted by one or more halogen atoms; and acid addition salts, acetate and benzoate esters and metal complexes of the compounds of formula (I) wherein R^2 is hydrogen.

4,931,083

PLANT GROWTH REGULATING TRIAZOLES

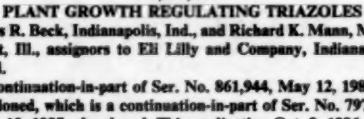
James R. Beck, Indianapolis, Ind., and Richard K. Mann, Mahomet, Ill., assignors to Eli Lilly and Company, Indianapolis, Ind.

Continuation-in-part of Ser. No. 861,944, May 12, 1986, abandoned, which is a continuation-in-part of Ser. No. 797,304, Nov. 12, 1985, abandoned. This application Oct. 9, 1986, Ser. No. 916,987

Int. Cl.[5] **A01N** *43/653;* **C07D** *249/12, 401/12*

U.S. Cl. 71—92 **26 Claims**

1. A compound of the formula



wherein
n is 0, 1 or 2;
X is —O— or —S—;
the R groups independently are halo, trifluoromethyl, trifluoromethoxy, difluoromethoxy, pentafluoroethoxy, 1,1,2,2-tetrafluoroethoxy, C_1–C_3 alkyl or C_1–C_3 alkoxy;
R^1 is C_1–C_4 primary or secondary alkyl;
R^2 is hydroxy, C_1–C_4 alkoxy, benzyloxy, phenoxy, $—N(R^4)(R^5)$ or a moiety forming a phytologically-acceptable salt;
R^3 is hydrogen or C_1–C_4 primary or secondary alkyl;
R^4 and R^5 independently are hydrogen, C_3–C_6 cycloalkyl or C_1–C_3 alkyl, or R^4 and R^5 combine with the nitrogen atom to which they are attached to form morpholino, pyrrolidino or piperidino.

26. A method for improving the yield of a soybean plate which comprises applying an effective amount of a compound of claim 1 to the plant at a time not later than the late reproductive growth stage.

4,931,084

HERBICIDAL SUBSTITUTED TRIAZOLINONES

Kurt Findeisen, Odenthal; Markus Lindig, Hilden; Hans-Joachim Santel, Leverkusen; Robert R. Schmidt, Bergisch-Gladbach, and Harry Strang, Duesseldorf, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

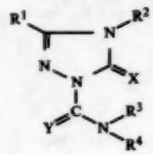
Filed Aug. 18, 1988, Ser. No. 233,691

Claims priority, application Fed. Rep. of Germany, Sep. 1, 1987, 3729070

Int. Cl.[5] A01N *43/653*; C07D *249/12*

U.S. Cl. 71—92 7 Claims

1. A substituted triazolinone of the formula



(I)

in which

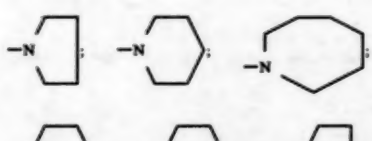
R^1 stands for

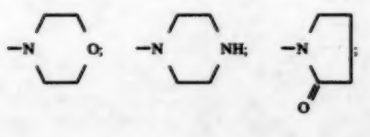
radical or for a $—S(O)_n—R^7$ radical

in which

R^5 and R^6 independently of one another in each case stand for in each case straight-chain or branched alkyl having 1 to 8 carbon atoms, alkenyl having 1 to 8 carbon atoms, alkynyl having 2 to 8 carbon atoms, halogenoalkyl having 1 to 8 carbon atoms and 1 to 17 identical or different halogen atoms, halogenoalkenyl having 2 to 8 carbon atoms and 1 to 15 identical or different halogen atoms, halogenoalkynyl having 2 to 8 carbon atoms and 1 to 13 identical or different halogen atoms, or alkoxyalkyl or alkoxy each having 1 to 6 carbon atoms in the individual alkyl parts, for cycloalkyl having 3 to 7 carbon atoms, for cycloalkylalkyl having 3 to 7 carbon atoms in the cycloalkyl part and 1 to 6 carbon atoms in the alkyl part or for aralkyl having 6 to 10 carbon atoms in the aryl part and 1 to 6 carbon atoms in the alkyl part, aryl having 6 to 10 carbon atoms, which are in each case optionally monosubstituted or polysubstituted by identical or different substituents selected from the group consisting of halogen, cyano, nitro and straight-chain or branched alkyl, alkoxy, alkylthio, halogenoalkyl, halogenoalkoxy or halogenoalkylthio each having 1 to 4 carbon atoms and 1 to 9 identical or different halogen atoms, or

R^5 and R^6, together with the nitrogen atom to which they are bonded, stand for a heterocyclic ring selected from the group consisting of





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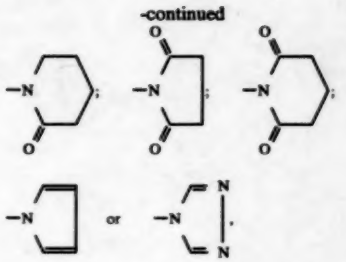


which is optionally monosubstituted or polysubstituted by identical or different substituents from the group consisting of halogen and alkyl or halogenoalkyl each having 1 to 4 carbon atoms and 1 to 9 identical or different halogen atoms and also 1 to 2 oxo or thiono groups,

R^7 stands for in each case straight-chain or branched alkyl having 1 to 8 carbon atoms, alkenyl having 2 to 8 carbon atoms, or alkynyl having 2 to 8 carbon atoms, for cycloalkyl having 3 to 7 carbon atoms, for cycloalkyalkyl having 3 to 7 carbon atoms in the cycloalkyl part and 1 to 6 carbon atoms in the alkyl part or for aralkyl having 6 to 10 carbon atoms in the aryl part and 1 to 6 carbon atoms in the alkyl part or aryl having 6 to 10 carbon atoms, which are each optionally substituted on the aryl by identical or different substituents selected from the the group consisting of halogen, cyano, nitro and straight-chain or branched alkyl, alkoxy or halogenoalkyl each having 1 to 4 carbon atoms and 1 to 9 identical or different halogen atoms, and

n stands for the number 0, 1 or 2,

R^2 stands for in each case straight-chain or branched alkyl having 1 to 8 carbon atoms, alkenyl having 2 to 8 carbon atoms, alkynyl having 2 to 8 carbon atoms, halogenoalkyl having 1 to 8 carbon atoms and 1 to 17 identical or different halogen atoms, halogenoalkenyl having 2 to 8 carbon atoms and 1 to 15 identical or different halogen atoms, halogenoalkynyl having 2 to 8 carbon atoms and 1 to 13 identical or different halogen atoms, or alkoxyalkyl or alkoxy each having 1 to 6 carbon atoms in the individual alkyl parts, for cycloalkylalkyl or cycloalkyl each having 3 to 7 carbon atoms in the cycloalkyl part and 1 to 6 carbon atoms in the straight-chain or branched alkyl part or for aralkyl or aryl each having 6 to 10 carbon atoms in the aryl part and 1 to 6 carbon atoms in the straight-chain or branched alkyl part, each of which is optionally substituted on the aryl by identical or different substituents selected from the group consisting of halogen, cyano, nitro, and also in each case straight-chain or branched alkyl, alkoxy, alkylthio, halogenoalkyl, halogenoalkoxy or halogenoalkylthio each having 1 to 4 carbon atoms and 1 to 9 identical or different halogen atoms,

R^3 stands for hydrogen or for straight-chain or branched alkyl having 1 to 8 carbon atoms,

R^4 stands for straight-chain or branched alkoximinoalkyl each having to 8 carbon atoms in the individual alkyl parts,

X stands for oxygen or sulphur and

Y stands for oxygen or sulphur.

4,931,085

HERBICIDAL COMPOSITION

Donald Wilson, Midhurst, England, assignor to Imperial Chemical Industries PLC, London, England

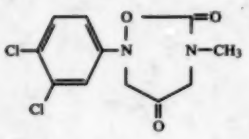
Continuation of Ser. No. 6,852, Jan. 27, 1987, abandoned. This application Apr. 14, 1989, Ser. No. 338,399

Claims priority, application United Kingdom, Jan. 27, 1986, 8601869

Int. Cl.[5] A01N *43/48*

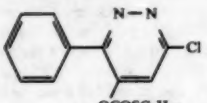
U.S. Cl. 71—92 4 Claims

1. A herbicidal composition comprising an effective amount of a compound of formula (IA):



(IA)

in combination with an effective amount of a compound of formula (IIA):



(IIA)

4,931,086

THIOLCARBAMATE-TRIAZINE LIQUID HERBICIDE COMPOSITION

Nadim C. Moucharafieh, 939 Lexington, #6, El Cerrito, Calif. 94530

Continuation of Ser. No. 920,554, Oct. 20, 1986, abandoned, Continuation-in-part of Ser. No. 354,980, Mar. 5, 1982, abandoned. This application Sep. 28, 1987, Ser. No. 102,052

Int. Cl.[5] A01N *43/66, 43/16*

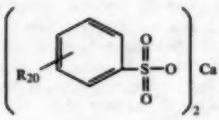
U.S. Cl. 71—93 4 Claims

1. A herbicidal composition comprising

"(a) a liquid thiolcarbamate selected from S-ethyl, N,N-diisobutyl thiolcarbamate or S-ethyl N,N-dipropyl thiocarbamate;"

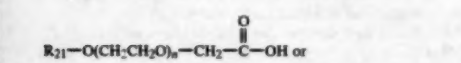
"(b) a solid s-triazine compound selected from atrazine or cyanazine;"

(c) optionally an antidotally effective amount of "N,N-diallyl dichloroacetamide or 2,2,5-trimethyl-3-dichloroacetyl oxazolidine;"



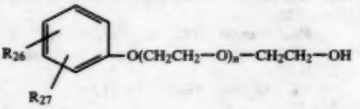
wherein R_{20} is a C_{10}–C_{15} alkyl;

(e) a non-ionic or modified non-ionic emulsifier having the structural formula



wherein n is the integer 7 through 14 and R_{21} is a hydrophobe of C_5–C_{20} alkyl, C_5–C_{20} alkylphenyl, C_5–C_{20} alkylnaphthyl or the di- or tri- C_5–C_{20} alkyl substituted phenyl or naphthyl

(f) a water-souble wetting agent that is insoluble in said thiolcarbamate having the structural formula



wherein R_{26} is C_7–C_{12} alkyl, R_{27} is C_7–C_{12} alkyl or hydrogen and m is the integer 50 through 150;

(g) the calcium salt of lignin sulfonate as a dispersing agent;

(h) an anti-foaming agent;

(i) fumed silicas; and

(j) water.

4,931,087

PICOLINIC ACID DERIVATIVES AND HERBICIDAL COMPOSITIONS

Masahiro Shigematsu; Hideo Ohi, both of Shizuoka; Shoji Kusano, Hamamatsu; Takeshige Miyazawa; Satoru Takahashi, both of Shizuoka; Yasuhumi Toyokawa, Shizuoka, and Ikuo Kajiwara, Nagaokakyo, all of Japan, assignors to Kumiai Chemical Industry Co., Ltd. and Ihara Chemical Industry Co., Ltd., both of Tokyo, Japan

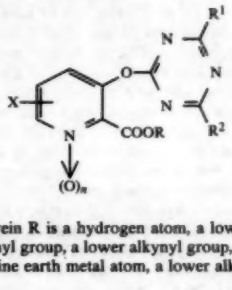
Division of Ser. No. 37,322, Apr. 13, 1987, Pat. No. 4,832,729. This application Jan. 12, 1989, Ser. No. 296,130

Claims priority, application Japan, Jun. 14, 1986, 61-138702; Feb. 12, 1987, 62-30588

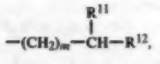
Int. Cl.[5] A01N *43/48;* C07D *251/00*

U.S. Cl. 71—93 6 Claims

1. A picolinic acid compound having the formula:



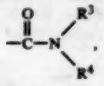
wherein R is a hydrogen atom, a lower alkyl group, a lower alkenyl group, a lower alkynyl group, an alkali metal atom, an alkaline earth metal atom, a lower alkylammonium group or



wherein R^{11} is a hydrogen atom or a lower alkyl group, R^{12} is a lower alkoxycarbonyl group, a cyano group, a halogen atom, an acetyl group, a pivaloyl group, a benzoyl group, a lower alkoxy group, a phenoxy group, a halogenacetyloxy group, a methylsulfonyloxy group, a hydroxyl group, a lower alkylthio group, a lower alkylsulfonyl group, a phenylthio group, a di-loweralkylamino group, a naphthyl group, a pyridyl group

wherein W is a hydrogen atom, a halogen atom, a lower alkyl

group, a lower alkoxy group, a phenoxy group, a nitro group or a lower alkoxycarbonyl group, and e is 1 or 2 or



wherein each of R^3 and R^4, which may be the same or different, is a hydrogen atom, a lower alkyl group, a lower alkenyl group or a phenyl group, and m is an integer of from 0 to 2, each of R^1 and R^2, which may be the same or different, is a halogen atom, a lower alkyl group, a lower alkoxy group or a lower haloalkoxy group, X is a hydrogen atom, a halogen atom or a lower alkyl group, and n is 0 or 1, or a salt thereof.

6. A method for killing weeds which comprises applying a herbicidally effective amount of a picolinic acid compound or a salt thereof as defined in claim 1 to a locus to be protected.

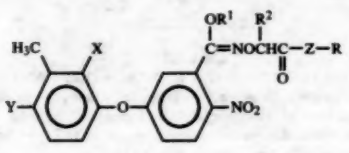
4,931,088

NOVEL 2-NITRO-5-(SUBSTITUTED PHENOXY)BENZOHYDROXIMIC ACID DERIVATIVES

Atsuhi Goh, Ushiku; Keiji Endo, and Yuri Yamamoto, both of Ami, all of Japan, assignors to Mitsubishi Petrochemical Co., Ltd., Tokyo, Japan

Filed Aug. 16, 1988, Ser. No. 232,647
Int. Cl.[5] A01N *33/24*
U.S. Cl. 71—100 **9 Claims**

1. A compound of the formula



(I)

in which each of X and Y represents a halogen atom, R represents a hydrogen atom, a lower alkyl group or an agronomically acceptable soluble salt ion, R^1 represents a lower alkyl group, R^2 represents a hydrogen atom, and Z represents an oxygen or sulfur atom.

8. A herbicidal composition comprising an effective amount of the compound of formula (I) set forth in claim 1 and an agriculturally and horticulturally acceptable carrier or diluent.

4,931,089

HERBICIDAL OIL IN WATER COMPOSITIONS OF PENDIMETHALIN

Craig A. Martin, Pennington, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Continuation of Ser. No. 7,066, Jan. 27, 1987, Pat. No. 4,810,279. This application Aug. 18, 1988, Ser. No. 234,062
Int. Cl.[5] A01N *33/06*
U.S. Cl. 71—121 **6 Claims**

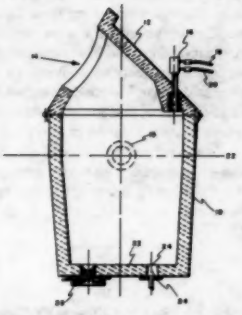
1. A herbicidal concentrated oil in water emulsion composition consisting essentially of, on a weight basis, about 5% to 40% pendimethalin; 5% to 40% of a water immiscible solvent; 0.5% to 5.0% of an alkylphenol polyethylene oxide condensate; 0.5% to 5.0% of an ethylene oxide/propylene oxide block copolymer; 0% to 5.0% of an anionic dispersant; and sufficient water to total 100%; wherein said water immiscible solvent consists essentially of xylene or an aromatic hydrocarbon mixture having a distillation range in a temperature range of about 183° C. to about 305° C.

4,931,090

PNEUMATIC STEELMAKING VESSEL AND METHOD OF PRODUCING STEEL

N. Edward Bottinelli, Dallas, Tex., and Norman L. Kotrabe, Tega Cay, S.C., assignors to Zia Technology, Inc., Dallas, Tex.

Filed Aug. 23, 1989, Ser. No. 397,388
Int. Cl.[5] C21C *7/00*
U.S. Cl. 75—10.16 **19 Claims**



1. A vessel for melting, refining, ladle metallurgy, and teeming of metal, comprising:

(a) a refractory lined ladle;

(b) a removable refractory lined ladle cover adapted to engage said refractory lined ladle, said ladle cover having an opening to permit charging therethrough as well as to permit the escape of gases and fumes;

(c) means for mounting said vessel and for tilting said vessel to a generally horizontal refining position;

(d) means integral with said removable refractory lined ladle cover for injecting oxygen through the refractory lined ladle cover, under the surface of, and directly into, the metal bath contained in the vessel when the vessel is in the generally horizontal refining position;

(e) means for introducing inert gas into the vessel for promoting homogeneity of chemistry and temperature of the metal contained in the vessel; and

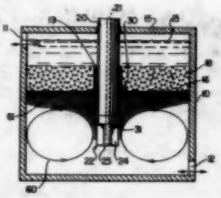
(f) tapping means for removing molten metal from the ladle.

4,931,091

TREATMENT OF MOLTEN LIGHT METALS AND APPARATUS

Peter D. Waite, and Ghyslain Dube, both of Jonquiere, Canada, assignors to Alcan International Limited, Montreal, Canada

Filed Jun. 7, 1989, Ser. No. 362,487
Claims priority, application Canada, Jun. 14, 1988, 569415
Int. Cl.[5] C22B *21/06*; F27D *23/04*
U.S. Cl. 75—680 **25 Claims**



1. Apparatus for treating molten metal comprising in combination:

(a) a heated vessel having inlet and outlet means for the continuous flow of said metal downwardly through said vessel,

(b) a perforated plate extending horizontally across said vessel dividing said vessel into an upper treatment section and a lower treatment section, said plate comprising an intermediate treatment section, and

(c) a device for injecting gas in the form of small discrete bubbles into said metal in said lower treatment section, said device comprising a hollow rotatable shaft extending downwardly through an opening in said plate with drive means coupled to the upper end of said shaft, a vaned rotor fixedly attached to the lower end of said shaft within said lower treatment section, with one or more passageways within said rotor for conducting said gas from the interior of said shaft to said metal in said lower treatment section, whereby upon rotation of said rotor and provision of said gas flow, said gas is injected into said metal in the form of small discrete bubbles which move away from the rotor and are uniformly dispersed within the lower treatment section.

4,931,092

METHOD FOR PRODUCING METAL BONDED MAGNETS

Alan J. Cisar, Sugar Land, and Calvin F. Brooks, Angleton, both of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Dec. 21, 1988, Ser. No. 287,828
Int. Cl.[5] C22C 29/14
U.S. Cl. 75—244 34 Claims

1. A process for producing a metal bonded magnet composite, said process comprising:

depositing a metal layer onto at least a portion of the surface of a plurality of particles of a magnetic material:

forming a shaped body from the particles; and

heating said shaped body sufficient to sinter the particles together whereby a metal-metal matrix composite magnet is formed,

wherein said magnetic material comprises a phase of NdFeB;

said deposited metal layer comprises a nonmagnetic ductile metal, said deposition being performed by chemical-plating of dissolved ductile metal onto the magnetic particles in a non-aqueous medium.

4,931,093

MARKER CR FELT TIP PEN

Matthias Brenke, and Detlef Koch, both of Hamburg, Fed. Rep. of Germany, assignors to Rotring-Werke Riepe KG, Hamburg, Fed. Rep. of Germany

Filed Dec. 12, 1988, Ser. No. 282,643
Claims priority, application Fed. Rep. of Germany, Dec. 31, 1987, 3744635
Int. Cl.[5] C09D 11/16
U.S. Cl. 106—19 5 Claims

1. A layout marker pen for use on absorbent writing and drawing materials having an ink composition based upon a relatively high boiling organic solvent comprising:

(a) 1-20% by weight of a water soluble or water dispersable dye;

(b) water at least sufficient for complete dissolution or dispersion of the dye, and

(c) an organic solvent in the form of alkylene carbonate for supplementstion to 100% by weight having a boiling point at standard pressure of at least 200° C., and having a vapor pressure at 20° C. of less than 0.05 mbar.

4,931,094

TITANIUM(IV)-CHELATES AND THEIR USE IN PRINTING INKS

Dieter Barfurth, Troisdorf-Spich; Claus Lindzus, Cologne, and Heinz Nestler, Troisdorf-Eschmar, all of Fed. Rep. of Germany, assignors to Huels Troisdorf AG, Troisdorf, Fed. Rep. of Germany

Filed Oct. 3, 1988, Ser. No. 252,700
Claims priority, application Fed. Rep. of Germany, Oct. 5, 1987, 3733608
Int. Cl.[5] C09D 11/00
U.S. Cl. 106—20 5 Claims

1. A titanium chelate of the formula:

$$Ti(OR)_{4-n}(citrate)_n$$

wherein

R is ethyl, propyl, isobutyl or butyl,

n is 1 or 2, and

citrate is the radical of a monoalkyl or dialkyl citrate, the alkyl moiety of which is ethyl, propyl, isobutyl or butyl.

4,931,095

BENZOATE INKS

Michael T. Nowak, Gardner, Mass., and Michael L. Demers, Nashua, N.H., assignors to Howtek, Inc., Hudson, N.H.

Filed Nov. 15, 1988, Ser. No. 272,020
Int. Cl.[5] C09D 11/00
U.S. Cl. 106—22 11 Claims

1. A hot-melt ink for ink jet printers comprising an organic solvent comprising one or more benzoates, said solvent having a melting point less than about 175° C. having a viscosity level less than 30 centpoise at jetting temperatures and further containing a dye.

4,931,096

SEALER FOR FILLING A DENTAL ROOT CANAL

Mutsuo Fujisawa, Musashino; Tsutomu Kameda; Hirofumi Katsura, both of Morioka; Reiichi Yamaga, Takatsuki, and Setsuko Ishido, Kiyose, all of Japan, assignors to Toyo Chemical Laboratories, Inc., Tokyo, Japan

Filed Sep. 20, 1988, Ser. No. 246,693
Claims priority, application Japan, Feb. 9, 1988, 63-26704; Jul. 7, 1988, 63-167715
Int. Cl.[5] A61K 6/08
U.S. Cl. 106—35 3 Claims

1. A dental root canal filling material comprising a gutta percha point and a sealer composition carried by said gutta percha point, said sealer composition comprising 3 to 20% by weight of gutta percha, or polyisoprene or a mixture thereof, 30 to 70% by weight of zinc oxide, 3 to 15% by weight of liquid paraffin, 2 to 26% by weight of Japan wax and 2 to 50% by weight of a radio-opaque material.

4,931,097

PROCESS FOR PREPARING ACTIVATORS FOR FAST-SETTING CEMENTS

Elliot I. Band, Tarrytown, N.Y., assignor to Rhone-Poulenc Basic Chemicals Co., Shelton, Conn.

Continuation-in-part of Ser. No. 787,558, Oct. 15, 1985, abandoned. This application Feb. 9, 1987, Ser. No. 12,582
Int. Cl.[5] C04B 7/00, 9/00, 11/00, 1/00
U.S. Cl. 106—672 3 Claims

1. A process for preparing a particulate solid activator comprising a porous material containing absorbed ammonium phosphate, said process comprises:

(a) heating a slurry of the porous material and an ammonium phosphate solution from about 30° C. to about 120° C. for from about 6 hours to about 192 hours; and then

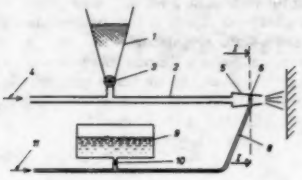
(b) spraying drying solid slurry to obtain said particulate solid activator.

4,931,098

METHOD FOR ADDING SILICA FUME TO DRY SHOTCRETE MIXTURE

Tore Danielsen, Kristiansand, Norway, and Eike Herfurth, Allensbach, Fed. Rep. of Germany, assignors to Elkem a/s, Norway

Filed Sep. 12, 1988, Ser. No. 243,476
Claims priority, application Norway, Sep. 11, 1987, 873789
Int. Cl.[5] C04B 7/02; B28C 5/06
U.S. Cl. 106—638 13 Claims



1. In the process of dry shotcreting wherein a dry cementitious composition is combined with water at a nozzle, the improvement comprising:

adding a silica fume composition to the water to form a first slurry of silica fume and water prior to combining the water and the dry cementitious composition; and

combining said first slurry and dry cementitious composition at the nozzle.

4,931,099

SELF-LEVELLING MORTAR MIXTURE

Jürgen Dobbers, Leverkusen; Karl Reizlein, Cologne, and Kurt Bredtmann, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Aug. 29, 1988, Ser. No. 237,961
Claims priority, application Fed. Rep. of Germany, Sep. 8, 1987, 3730067
Int. Cl.[5] C04B 11/05, 11/06
U.S. Cl. 106—775 6 Claims

1. In an improved self-levelling mortar mixture containing synthetic anhydrite, activator salts, plasticizers, surfactants and water

the improvement comprises said anhydrite containing both coarse-grained anhydrite and finely ground anhydrite wherein the ratio by weight of coarse-grained synthetic anhydrite to finely ground synthetic anhydrite is 1:1 to 6:1 and wherein at least 80% by weight of the particles of the finely ground anhydrite have a size of 0.09 mm or less.

4,931,100

BORON-CONTAINING PRECERAMIC BLEND AND FIBER FORMED THEREFROM

Robert E. Johnson, Hoboken, N.J., assignor to Hoechst Celanese Corp., Somerville, N.J.

Division of Ser. No. 82,761, Aug. 7, 1987, Pat. No. 4,832,895, which is a continuation-in-part of Ser. No. 933,413, Nov. 21, 1986, abandoned. This application Jan. 5, 1989, Ser. No. 293,765
Int. Cl.[5] C08L 33/12
U.S. Cl. 106—163.1 5 Claims

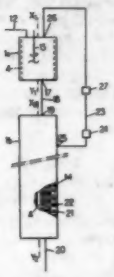
1. A preceramic blend comprising a mixture of a precarbonaceous polymer and a preceramic boron-containing polymer wherein said boron-containing polymer consists essentially of the condensation product of a borane with a Lewis base selected from the group consisting of amines, amides, isocyanates, nitriles and phosphines.

4,931,101

METHOD AND INSTALLATION FOR THE PREPARATION OF ANHYDROUS CRYSTALLINE DEXTROSE

Jean-Bernard Leleu, Lestrem, France, assignor to Roquette Freres, Lestrem, France

Continuation of Ser. No. 863,142, May 14, 1986, abandoned. This application Oct. 24, 1988, Ser. No. 262,048
Claims priority, application France, May 15, 1985, 85 07429
Int. Cl.[5] C13F 1/02
U.S. Cl. 127—60 7 Claims



1. A method for the continuous preparation of anhydrous crystalline dextrose comprising the steps of

introducing a syrup rich in glucose having a richness in glucose higher than 92% by weight, an amount of dry matter higher than 80% by weight and a temperature above 60° C. into a starting zone of substantially vertical axis and having an upper and a lower end for initiation of the crystallization of dextrose, the temperature within said starting zone being substantially constant and less by 2° to 5° C. than the saturation temperature,

causing said syrup to travel through said starting zone under stirring for about 8 to 24 hours at about 80° C. to 90° C. in the presence of anhydrous dextrose crystals acting as crystallization seeds, said syrup and said crystals forming a mixture,

introducing said mixture, whose temperature is about 75° C. to 88° C., when emerging from the starting zone into a crystallization zone separate from the starting zone and of axis substantially vertically arranged substantially in extension of the axis of the starting zone, said crystallization zone having an upper and lower end,

causing said mixture to travel under malaxation through said crystallization zone and subjecting said mixture within said crystallization zone to a temperature gradient decreasing globally from 0.2° to 2° C./hour from the upper to the lower end, the temperature of the upper end being about 75° C. to 88° C. while the temperature of the lower end being above 55° C.,

taking up at a level of the crystallization zone located in the upper third of the crystallization zone when the starting zone represents about one third of the crystallization zone, a fraction of the mixture travelling through said crystallization zone, said fraction representing from 10 to 120% by volume of the amount of glucose syrup introduced into the starting zone,

recycling said fraction to the vicinity of the upper end of said starting zone,

collecting at the lower end of said crystallization zone a crystalline mass rich in anhydrous dextrose crystals, and

recovering said anhydrous dextrose crystals from said crystalline mass.

4,931,102

METAL CLEANING PROCESS

John M. Burke, Kirtland, Ohio, assignor to Eaton Corporation, Cleveland, Ohio

Filed Sep. 1, 1988, Ser. No. 239,255
Int. Cl.[5] B05D *5/00*
U.S. Cl. 134—2 **32 Claims**

1. A process for cleaning metal in preparation for adhering a wear resistant material thereto, said process including the steps of:

(a) washing the metal in an alkaline soap and water solution;

(b) rinsing the metal resulting from step (a) at least once with deionized water having a volume resistivity of at least about 10^5 ohm-cm at 25° C.;

(c) rinsing the metal resulting from step (b) with a mixture of deionized water having a volume resistivity of at least about 10^5 ohm-cm at 25° C. and a water soluble amine having a vapor pressure of at least about 10% of the vapor pressure of water at 20° C.; and

(d) drying the metal resulting from step (c).

4,931,103

TRICHOLINE PHOSPHATE SURFACE TREATING AGENT

Charles B. Atwater, Springfield, Mo., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Aug. 11, 1988, Ser. No. 230,951
Int. Cl.[5] B08B *3/08*
U.S. Cl. 134—2 **19 Claims**

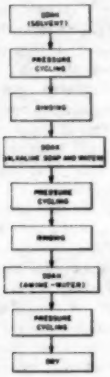
1. A method of stripping a photoresist from a substrate, the photoresist having been exposed, imagewise, to an actinic radiation source, which comprises contacting the substrate having the photoresist thereon with sufficient surface treating solution at a temperature and for a time sufficient to remove the photoresist from the substrate, the solution containing an effective concentration of tricholine phosphate as a surface treating agent.

4,931,104

PROCESS FOR CLEANING POROUS PARTS

John M. Burke, Kirtland, Ohio, assignor to Eaton Corporation, Cleveland, Ohio

Filed Jun. 5, 1989, Ser. No. 361,190
Int. Cl.[5] C23G *5/024*; B08B *7/04*
U.S. Cl. 134—40 **18 Claims**



1. A process for removing oil or oil-like material from porous parts, said process comprising the steps of:

(a) soaking the parts in a solvent predetermined suitable for solubilizing the oil or oil-like material;

(b) alternately subjecting the parts soaking in the solvent of step (a) to a predetermined pressure below atmospheric pressure and to a predetermined pressure above atmospheric pressure a preselected number of times;

(c) rinsing the parts of step (b) with water;

(d) soaking the parts of step (c) in an alkaline soap and water solution having a prescribed alkalinity;

(e) alternately subjecting the parts soaking in the solution of step (d) to a pressure less than atmospheric pressure and to a pressure above atmospheric pressure a preselected number of times;

(f) rinsing the parts of step (e) with water;

(g) soaking the parts of step (f) in a predetermined mixture of water and a water soluble amine;

(h) alternately subjecting the parts in the mixture of step (g) to a predetermined pressure below atmospheric pressure and to a predetermined pressure above atmospheric a preselected number of times; and

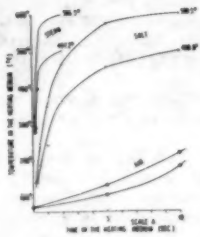
(i) drying the parts of step (h).

4,931,105

PROCESS FOR HEAT TREATING BERYLLIUM COPPER

Dudley H. Woodard, Willoughby, Ohio, assignor to Beryllium Copper Processes L.P., Beachwood, Ohio

Filed Feb. 16, 1989, Ser. No. 310,987
Int. Cl.[5] C22F *1/08*
U.S. Cl. 148—2 **24 Claims**



1. A process for producing primary products from GP zone and gamma precipitate containing alloys, which process comprises the steps of:

preparing a copper beryllium alloy melt;

casting the alloy melt by a continuous process or hot working a cast alloy and solution annealing the hot worked alloy:

passing the alloy through one or more cold-working steps:

applying mechanical and thermal treatments to decrease the residual lattice strains created by cold working the alloy; and then

subjecting the alloy to one or more heat treatments at temperatures ranging between 150° F. and 800° F., in a condensing vapor type heat treating media that gives a rate of heat flow from the interface into the alloy that is fast enough to create those (α) precipitation mechanism rates that result in increases in elongations and decreases in proportional limits before quenching.

4,931,106

HOT ROLLED STEEL SHEET HAVING HIGH RESISTANCES AGAINST SECONDARY-WORK EMBRITTLEMENT AND BRAZING EMBRITTLEMENT AND ADAPTED FOR ULTRA-DEEP DRAWING AND A METHOD FOR PRODUCING THE SAME

Akio Tosaka; Kei Sakata; Koichi Hashiguchi, all of Chiba; Tateo Higashino, Kurashiki, and Toshio Ichida, Chiba, all of Japan, assignors to Kawasaki Steel Corporation, Japan

Filed Sep. 7, 1988, Ser. No. 241,386
Claims priority, application Japan, Sep. 14, 1987, 62-228570; Jun. 10, 1988, 63-141846
Int. Cl.[5] C22C *38/14*; C21D *8/04*
U.S. Cl. 148—12 C 3 Claims

3. A method for producing a hot rolled steel sheet having high resistances against secondary-work embrittlement and brazing embrittlement and adapted for ultra-deep drawing, comprising heating a slab having the following composition up to a temperature of 1,000°–1,280° C., hot rolling the above heated slab at a finishing hot rolling temperature of 880°–920° C., starting the cooling of the finishing hot-rolled steel sheet within one second after completion of the finishing hot rolling, cooling continuously the sheet at a cooling rate of 10° C./sec or higher, and coiling the cooled steel sheet at a temperature within the range of 550°–480° C., said composition consisting, in % by weight, of

C: not more than 0.0040%,
Mn: not more than 0.20%,

$$\text{Ti: } \left[\left(\frac{48}{14}\text{N(\%)} + \frac{48}{32}\text{S(\%)} + 0.003\right) \text{to } \left(3 \times \frac{48}{12}\text{C(\%)} + \frac{48}{14}\text{N(\%)} + \frac{48}{32}\text{S(\%)}\right)\right]\%,$$

B: 0.0002–0.0020%,
Al: 0.005–0.10%,
N: not more than 0.0040%,
P: not more than 0.015%,
S: not more than 0.0035%,

and the remainder being substantially Fe.

4,931,107

PROCESS FOR PRODUCING A COLD ROLLED STEEL SHEET HAVING A GOOD AGEING RESISTANCE BY CONTINUOUS ANNEALING

Teruaki Yamada; Toshiyasu Ukena, both of Himeji; Osamu Akisue, Sagamihara; Kenji Kawai, Himeji; Yuuji Sano, Himeji, and Teruki Hayashida, Himeji, all of Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed Feb. 24, 1989, Ser. No. 314,925
Claims priority, application Japan, Sep. 28, 1988, 63-243470
Int. Cl.[5] C21D *8/02*
U.S. Cl. 148—12.3 3 Claims

1. A process for producing a cold rolled steel sheet having good ageing resistance by continuous annealing, which comprises

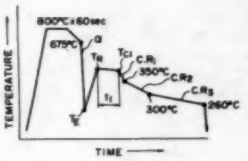
hot rolling steel essentially consisting of 0.010 to 0.06% by weight of C, 0.05 to 0.4% by weight of Mn, 0.002 to 0.025% by weight of S, not more than 0.10% by weight of P, 0.01 to 0.10% by weight of sol. Al, 0.0010 to 0.0060% by weight of N and the balance being iron and inevitable impurities, according to an ordinary hot rolling procedure, thereby making a hot rolled sheet;

cold rolling the hot rolled sheet, thereby making a cold rolled sheet;

subjecting the cold rolled sheet to continuous annealing to cause recrystallization and grain growth;

quenching the steel after the recrystallization and the grain growth, at a cooling rate (α) of 50°–250° C./sec from 720°–600° C. to a quenching end temperature (T_E) of 200°–310° C.;

reheating the steel sheet after retaining the steel sheet at the T_E temperature for 0 to 15 seconds, by at least 40° C. up to a reheating temperature (T_R) of 320°–400° C.;



retaining the T_R temperature of the steel sheet for t_1 seconds defined by the following formula (1) or cooling the steel sheet of a rate not more than 0.7° C./sec for t_1 seconds defined by the following formula (1);

then cooling the steel sheet at an average cooling rate of not more than 10° C./sec in a temperature zone of not lower than 350° C. in the case where T_R exceeds 350° C., and then cooling the steel sheet in a non-linear inclinatory manner wherein cooling is conducted at an average cooling rate ($C.R_2$) defined by the following formula (2) in a temperature zone of lower than 350° C. to 300° C. and at an average cooling rate ($C.R_3$) defined by the following formula (3) down to 285°–220° C. in a temperature zone of lower than 300° C.:

$$t_s \leqq t_1 \leqq t_k + 20 \quad (1)$$

$$C.R_{2s} \leqq C.R_2 \leqq C.R_{2k} \quad (2)$$

$$C.R_{3s} \leqq C.R_3 \leqq C.R_{3k} \quad (3)$$

wherein:

$$t_s = \frac{1}{(-2.146 \times (1/\alpha) + 0.1211)} \times \exp(0.0130 \times T_E + 25024/(546 + T_R + T_{C1}) - 23.33)$$

$$t_k = \frac{1}{(-2.146 \times (1/\alpha) + 0.1211)} \times \exp(0.0130 \times T_E + 25024/(546 + T_R + T_{C1}) - 22.45)$$

$$C \cdot R_{2s} = (-2.983 \times (1/\alpha) + 0.168) \times \exp(-0.0130 \times T_E + 5.18)$$

$$C \cdot R_{2k} = (-4.185 \times (1/\alpha) + 0.263) \times \exp(-0.0130 \times T_E + 6.06)$$

$$C \cdot R_{3s} = (-0.695 \times (1/\alpha) + 0.0392) \times \exp(-0.0130 \times T_E + 5.18)$$

-continued

$$C \cdot R_{3A} = (-1.313 \times (1/\alpha) + 0.0741) \times \exp(-0.0130 \times T_E + 6.06)$$

t_s: minimum time for the inclinatory cooling or retaining of the steel sheet at the same temperature, each of which is carried out after the reheating (sec)

t_A: maximum time for the inclinatory cooling or retaining of the steel sheet at the same temperature, each of which is carried out after the reheating (sec)

α: cooling rate of quenching before the supercooling (°C./sec)

T_E: quenching end temperature (°C.)

T_R: reheating temperature (°C.)

T_{C1}: end temperature of the inclinatory cooling or retaining of the steel sheet at the same temperature, each of which is carried out after the heating (°C.)

$C.R_{2s}$: minimum average cooling rate in the zone of lower than 350° C. to 300° C. (°C./sec)

$C.R_{2A}$: maximum average cooling rate in the zone of lower than 350° C. to 300° C. (°C./sec)

$C.R_{3s}$: minimum average cooling rate in the zone of lower than 300° C.(°C./sec)

$C.R_{3A}$: maximum average cooling rate in the zone of lower than 300° C.(°C./sec).

4,931,108

METHOD OF HEAT TREATMENT OF ROLLED STEEL MATERIAL USING FOAMS IMPREGNATED WITH WATER SOLUBLE POLYMERS

Norio Aazawa; Hisashi Yazaki; Kozi Adachi; Naoki Watanabe; Shuichi Miyabe, all of Muroran, and Kozo Kitazawa, Wakayama, all of Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

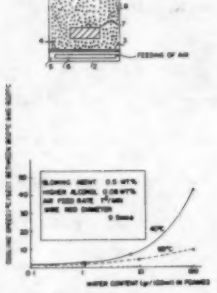
PCT No. PCT/JP87/00660, § 371 Date Jun. 30, 1988, § 102(e) Date Jun. 30, 1988, PCT Pub. No. WO88/01652, PCT Pub. Date Mar. 10, 1988

PCT Filed Sep. 4, 1987, Ser. No. 210,581

Claims priority, application Japan, Apr. 6, 1987, 62-82990; Apr. 13, 1987, 62-88876; Sep. 4, 1987, 61-206716

Int. Cl.[5] C21D *1/48*; B23K *35/24*

U.S. Cl. 148—18 **6 Claims**



1. A method for cooling a rolled steel material, which comprises immersing a hot-rolled steel material in foams obtained by adding a blowing agent to water, which foams have a water content of 0.01 to 80 g/100 ml, to cool the steel material by the foams.

4,931,109

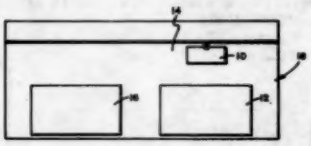
METHOD AND APPARATUS FOR DEPOSITING AN INORGANIC PHOSPHATE COATING

Winston E. Sabatka, Lakeville, Minn., assignor to Finishing Equipment, Inc., St. Paul, Minn.

Continuation-in-part of Ser. No. 95,739, Sep. 11, 1987, abandoned. This application Aug. 10, 1988, Ser. No. 230,751

Int. Cl.[5] C23C *22/03*

U.S. Cl. 148—249 **13 Claims**



6. A process for depositing a phosphate coating, the process comprising: contacting a metal substrate with a first liquid composition comprising a halohydrocarbon, a solubilizing solvent alcohol capable of solubilizing the phosphoric acid in the halohydrocarbon and present in the composition in an amount between 25 volume percent and a level corresponding to the flammable concentration of the alcohol, a phosphatizing proportion of phosphoric acid, and water in an amount exceeding the proportion of phosphoric acid, while being sufficient for the composition to deposit on the metal substrate a phosphate coating of substantial water insolubility while retaining continuous liquid phase homogeneity; and

providing a second liquid composition in proximity to the first liquid composition so that vapors from the second composition are commingled with vapors from the first composition, the second composition including a level of alcohol so that the vapors from the second composition when commingled with vapors from the first composition produce a vapor having an alcohol content that is not flammable.

4,931,110

EMULSION EXPLOSIVES CONTAINING A POLYMERIC EMULSIFIER

Lee F. McKenzie, Riverton, and Lawrence D. Lawrence, Sandy, both of Utah, assignors to IRECO Incorporated, Salt Lake City, Utah

Filed Mar. 3, 1989, Ser. No. 318,768

The portion of the term of this patent subsequent to Apr. 11, 2006, has been disclaimed.

Int. Cl.[5] C06B *45/00*

U.S. Cl. 149—2 **12 Claims**

1. A water-in-oil emulsion explosive or emulsion component of an explosive comprising an organic fuel as a continuous phase; an emulsified inorganic oxidizer salt solution or melt as a discontinuous phase; a density reducing agent and, as an emulsifier, a covalent bis-alkanolamine or bis-polyol derivative of a bis-carboxylated or anhydride derivatized olefinic or vinyl addition polymer in which the olefinic or vinyl addition polymer chain has an average chain length of from about 10 to about 32 carbon atoms, excluding side chains or branching.

4,931,111

AZIDE GAS GENERATING COMPOSITION FOR INFLATABLE DEVICES

Donald R. Poole, Woodinville, and Michael A. Wilson, Bothell, both of Wash., assignors to Automotive Systems Laboratory, Inc., Farmington Hills, Mich.

Filed Nov. 6, 1989, Ser. No. 432,150
Int. Cl.[5] C06G 35/00
U.S. Cl. 149—35 7 Claims

1. An increased burn rate gas generating composition comprising a mixture of:

(a) about 50 to about 70 percent by weight of an inorganic metal azide,

(b) about 2 to about 30 percent by weight of a primary metal oxide oxidizing compound, and

(c) about 2 to about 40 percent by weight of a burn rate controlling mixture of a secondary metal oxidizing compound and clay wherein the weight ratio of said secondary oxidizing compound to said clay is about 1:1 to about 1:8.

4,931,112

GAS GENERATING COMPOSITIONS CONTAINING NITROTRIAZALONE

Robert B. Wardle, Logan; Jerald C. Hinshaw, Ogden, and Robert M. Hajik, Willard, all of Utah, assignors to Morton International, Inc., Chicago, Ill.

Filed Nov. 20, 1989, Ser. No. 439,464
Int. Cl.[5] C06B 25/00
U.S. Cl. 149—88 11 Claims

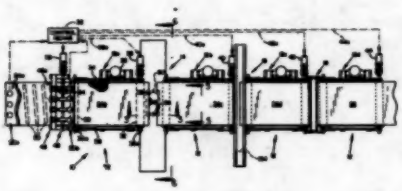
1. A composition consisting essentially of from about 25% to about 75% by weight nitrotriazalone and from about 25% to about 75% by weight of an anhydrous oxidizing salt having a cation selected from metals of group I-A of the Periodic Table (except sodium), calcium, strontium, or barium, said salt having an anion which is essentially free of carbon, hydrogen, and halogens.

4,931,113

VENEER EDGE JOINDER METHOD AND APPARATUS

Raymond A. Feichtmeir, San Francisco, Calif.; LeRoy E. Cothrell, Gresham, Oreg.; Jack E. Moon, Nampa, Id., and Ted R. Turner, Hines, Oreg., assignors to Tecton Laminates Corp., Hines, Oreg.

Filed Mar. 9, 1989, Ser. No. 321,106
Int. Cl.[5] B27D 1/00
U.S. Cl. 156—64 7 Claims



1. An apparatus for edge joining veneer sheets to form a continuous length of veneer comprising:

elongate conveyor means for transporting the veneer sheets as a series of sheets with opposed terminal edges leading and trailing each sheet, and plural work stations distributed along the length of said conveyor means, each work station having means for working on a terminal edge of a veneer sheet occupying the station, and the plural work stations including at least one station for working on one of said opposed terminal edges of a veneer sheet and another station for working on the opposite terminal edge of a veneer sheet;

sensing means sensing the distance between opposed terminal edges of each of successive veneer sheets in the series of sheets carried by said conveyor means; and

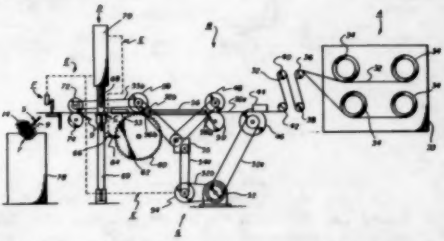
control means responsive to said sensing means controlling operation of said conveyor means whereby one sheet in the series of sheets is stopped by said conveyor means with its said one terminal edge properly positioned in said one station for work to be performed thereon concurrently with the time that a preceding sheet in said series is stopped by said conveyor means with its said opposite terminal edge properly positioned in said other station for work to be performed thereon by said other station.

4,931,114

METHOD AND APPARATUS FOR PRODUCING ULTRASONICALLY WELDED POMPONS

Robert F. Sliva, 807 Patchester, Houston, Tex. 77079

Division of Ser. No. 508,731, Jun. 29, 1983, Pat. No. 4,490,419.
This application Dec. 20, 1984, Ser. No. 684,005
Int. Cl.[5] B29C 65/08; D04D 7/06
U.S. Cl. 156—73.1 2 Claims



1. A process for producing pompons, comprising the steps of:

cutting thermoplastic sheet material into a plurality of streamer members;

forming said plurality of streamer members into a streamer cluster;

holding a pompon gripping member having a crown piece mating surface in station below an ultrasonic welding horn;

moving said streamer cluster into station above said crown piece mating surface of said gripping member at a position intermediate of said mating surface and said ultrasonic welding horn;

actuating said ultrasonic welding horn to move into contact with said streamer cluster;

energizing said ultrasonic welding horn upon contact with said streamer cluster to fuse said streamer cluster to said mating surface;

de-energizing said ultrasonic welding horn upon completion of fusion of said streamer cluster to said mating surface;

moving said gripping member having said streamer cluster fused to said mating surface thereof out of station below said ultrasonic welding horn; and

severing said streamer cluster to which said gripping member had been fused.

2. An apparatus for producing pompons comprising:

a means for cutting thermoplastic sheet material into a plurality of streamer members;

a means for forming said plurality of streamer members into a streamer cluster;

a means for holding a pompon gripping member having a crown piece mating surface in station below an ultrasonic welding horn;

a means for moving said streamer cluster into station above said crown piece mating surface of said gripping member at a position intermediate of said mating surface and said ultrasonic welding horn;

a means for actuating said ultrasonic welding horn to move into contact with said streamer cluster;

a means for energizing said ultrasonic welding horn upon

contact with said streamer cluster to fuse said streamer cluster to said mating surface;

a means to de-energize said ultrasonic welding horn upon completion of fusion of said streamer cluster to said mating surface;

a means for moving said gripping member having said streamer cluster fused to said mating surface thereof out of station below said ultrasonic welding horn; and

a means for severing said streamer cluster to which said gripping member has been fused.

4,931,115

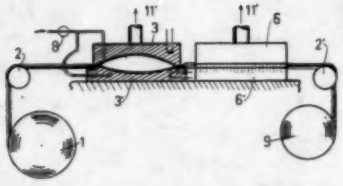
PLASTIC CLOTHING AND METHOD OF FABRICATION

Anne C. Pajunen, 5866 Eilat Dr., Woodland Hills, Calif. 91367

Filed Apr. 16, 1987, Ser. No. 38,935

Int. Cl.[5] B32B *31/18, 31/20, 31/22*

U.S. Cl. 156—73.1 **2 Claims**



1. A process for producing clothing comprised of:

a. feeding a section of flattened thermoplastic tubing into a heated, two piece mold which is internally shaped in the form of the desired article of clothing so that a portion of the tubing is trapped and sealed off from the ambient air, drawing a vacuum between the walls of the mold and the tubing so that the tubing expands to conform to the internally shaped form of the mold and is permanently shaped into the desired article;

b. relieving the vacuum, applying positive air pressure between the walls of the mold and the now-formed tubing so as to free it from the mold and opening the mold;

c. drawing the sheet of tubing containing the formed article of clothing into a perforating press made up of a flat, moveable head containing needles arranged in a suitable pattern and a flat stationary bed containing holes corresponding to the position of said needles;

4,931,116

HEAT-RECOVERABLE COUPLER

Nachum Rosenzweig, Palo Alto, Calif., assignor to Raychem Corporation, Menlo Park, Calif.

Continuation-in-part of Ser. No. 867,830, May 27, 1986, abandoned. This application Aug. 25, 1987, Ser. No. 89,389

Claims priority, application European Pat. Off., May 26, 1987, 87304621.3

Int. Cl.[5] B32B *31/26*

U.S. Cl. 156—85 **19 Claims**

1. A heat-shrinkable coupler which is suitable for joining two pipes, and which comprises

(1) a generally cylindrical radially heat-shrinkable member which is composed of a conductive polymer and which comprises

(a) a first axially-extending portion;

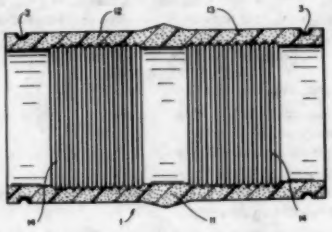
(b) a second axially-extending portion; and

(c) a third axially-extending portion;

the second portion lying between the first and third portions; and

(2) electrodes which can be connected to a source of electrical power;

the coupler being such that when the electrodes are connected to a suitable power source, in the absence of any pipes, current passes through the heat-shrinkable member, thus heating the member until the coupler shrinks, and the maximum temperature reached by the outside surface of the second portion is less



than the maximum temperatures reached by the outside surfaces of the first and third portions.

4,931,117

METHOD FOR MANUFACTURING FRICTIONAL LOCKING RINGS FOR STEPPED MOTOR VEHICLE TRANSMISSION SYNCHRONIZING MECHANISMS

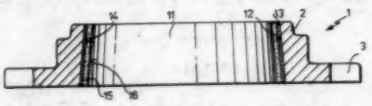
Erich R. Müller, Öhringen-Cappel; Günther Schmidt, Neuenstadt, and Klaus Hofmeister, Öhringen-Michelbach, all of Fed. Rep. of Germany, assignors to ZWN Zahnradwerk Neuenstein GmbH & Co., Neuenstein, Fed. Rep. of Germany

Filed Nov. 3, 1987, Ser. No. 116,029

Claims priority, application Fed. Rep. of Germany, Nov. 3, 1986, 3637386

Int. Cl.[5] B32B *18/00*

U.S. Cl. 156—89 **10 Claims**



1. A method for manufacturing frictional locking rings for stepped motor vehicle transmission synchronizing mechanisms, comprising the steps of

manufacturing a ring-shaped metallic base member provided with a conical locking surface;

providing said locking surface with a frictional body of hollow conical shape, said frictional body being made of a sintering powder;

directly sintering said frictional body on said locking surface.

4,931,118

METHOD OF MANUFACTURING MULTIRIBBED BELTS

Koji Kitahama; Kyoichi Mishima, and Toshimi Kumasaki, all of Hyogo, Japan, assignors to Mitsuboshi Belting Ltd., Kobe, Japan

Filed Jan. 23, 1989, Ser. No. 299,261

Claims priority, application Japan, Jan. 23, 1988, 63-13321

Int. Cl.[5] B29H *7/22*

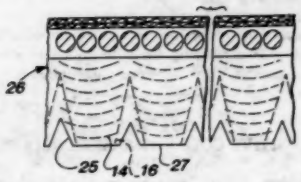
U.S. Cl. 156—138 **9 Claims**

1. The method of manufacturing a multirib power transmission belt comprising the steps of:

forming a belt preform defining an unvulcanized rubber compression layer having transversely extending staple fibers distributed therein;

causing the compression layer to be vulcanized while urging the compression layer against a mold having a suitable projection to form an inwardly widening groove in the confronting surface of the compression layer, the rubber

of the compression layer adjacent the groove being displaced outwardly relative to the rubber spaced from said groove, said grove having a depth in the range of approxi-



mately 20% to 50% of the ribs intended to be formed in the power transmission belt; and

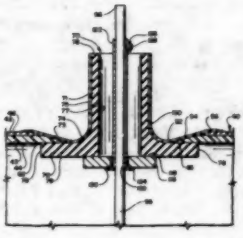
removing material from the compression layer at said grove to form the intended multirib power transmission belt.

4,931,119

METHOD FOR MAKING A REINFORCED THERMOSETTING RESIN STRUCTURE WITH INTEGRAL UNFLANGED NOZZLE

Richard L. T. Watkins, c/o Flbrex Corporation, 401 Sharon, Burlington, Wash. 98233

Filed Jun. 27, 1988, Ser. No. 212,414
Int. Cl.[5] B32B *31/02*
U.S. Cl. 156—173 **58 Claims**



1. A method for producing an article of manufacture, comprising the steps of:

(a) providing a primary structure comprising a primary structure wall with an interior surface and an exterior surface, and having a through branch opening defined by a wall edge portion.

(b) providing a mold member comprising

(i) a branch forming portion,

(ii) a flange portion having a locating surface adapted to engage an interior edge surface portion of the interior surface of said primary structure adjacent to said opening,

(iii) a transition portion interconnecting said branch forming portion and said flange portion,

(iv) said transition portion and said branch forming portion having an outer forming surface portion,

(c) locating said mold member in an operating position where

(i) said branch forming portion extends outwardly from said through opening, and

(ii) said flange portion fits against said interior edge surface portion,

(d) said transition portion being configured so that with the mold member in said operating position, said outer forming surface is tangentially aligned with an inner edge surface portion of said primary structure,

(e) applying a quantity of resin material to said outer forming surface portion of said mold and to adjacent portions of said structure to form a branch pipe section attached to said primary structure and providing a transition surface portion blending into the interior edge surface portion of said primary structure,

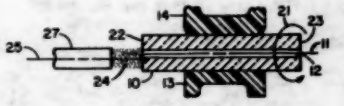
(f) disengaging said mold member from said primary structure.

4,931,120

METHOD OF TAPERING END OF CAPILLARY TUBE BORE FOR OPTIC FIBER COUPLING

William R. Christoff, Elmira, N.Y., assignor to Corning Incorporated, Corning, N.Y.

Filed Dec. 27, 1988, Ser. No. 292,550
Int. Cl.[5] G02B *6/38*; B65H *69/02*
U.S. Cl. 156—153 **13 Claims**



1. In a method of forming an optical energy transfer device comprising the steps of

providing a tube having first and second opposite endfaces and a bore which extends longitudinally therethrough, said bore having a longitudinal axis, said tube being formed of brittle material,

forming at the first endface of said tube an enlarged tapered aperture;

inserting into said tapered aperture at least one optical fiber, and

applying bonding material to said optical fiber and to said tapered aperture to secure said fiber to said tube,

said method being characterized in that the step of forming comprises

directing a first stream of abrasive particles toward said tube endface, said stream contacting less than the entirety of said first endface, said stream contacting said first endface such that one edge of said stream extends further from the axis of said bore than the edge of said stream opposite said one edge, and rotating said tube about said longitudinal axis, in the vicinity of the intersection of said aperture with said first endface, the step of directing being continued for a sufficient length of time to enlarge that portion of said bore that intersects said first endface.

4,931,121

PROCESS FOR FORMING A PLASTIC ARTICLE FROM A PLURALITY OF LAYERS OF THERMOPLASTIC MATERIAL

Otto C. Raspor, Saginaw, and James C. Pawloski, Bay City, both of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed May 23, 1985, Ser. No. 737,298
Int. Cl.[5] B29C *51/14*, *65/02*
U.S. Cl. 156—213 **14 Claims**

1. A process for forming a plastic article comprising the steps of:

(a) heating separately at least one layer of a plurality of diverse layers of thermoplastic material to a temperature not to exceed the melting temperature of any thermoplastic material in the layer to be heated, the total thermoplastic material in the plurality of diverse layers being sufficient to form the plastic article;

(b) stacking the plurality of diverse layers immediately after heating at least one layer and immediately prior to forging;

(c) providing lubrication for the plurality of diverse layers of

thermoplastic material sufficient to permit substantial plug flow of the plurality of diverse layers of thermoplastic material during forging;

(d) forging the plurality of diverse layers of thermoplastic material by substantial plug flow in a mold heated to a temperature at least as high as the lowest softening temperature of any thermoplastic material present in the plurality of diverse layers of thermoplastic material into a preform whose peripheral portion is rapidly cooled below the softening temperature while being retained;

(e) immediately thermoforming the preform into the plastic article having a desired shape and size; and

(f) permitting the plastic article to cool.

4,931,122

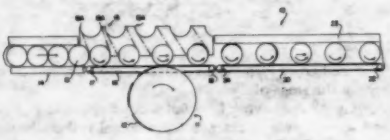
STRAIGHT THROUGH LABELLING MACHINE

Monte C. Mitchell, Modesto, Calif., assignor to B & H Manufacturing Company, Inc., Ceres, Calif.

Filed May 31, 1988, Ser. No. 200,359

Int. Cl.[5] B65C *3/16, 9/04*

U.S. Cl. 156—215 **11 Claims**



2. In a machine for applying segments of sheet or film material to the cylinder surfaces of cylindrical articles, such machine including a rotatable, cylindrical vacuum drum capable of receiving such segments on its cylinder surface, holding each segment on such surface while rotating, and releasing each segment to the cylinder surface of such an article as it moves past and in tangent contact with the cylinder surface of the vacuum drum, the improvement which comprises:

(a) a helical article feed arranged to transport such articles with their cylinder axes parallel to the cylinder axis of the vacuum drum in a linear path past the cylinder surface of the vacuum drum, such helical artical feed being spaced from said drum surface such that each container, as it moves past the vacuum drum, is pressed into tangent contact with a segment on the drum and

(b) endless belt means arranged to contact the surface of such container opposite the container surface in contact with the helical article feed

(c) such helical article feed and endless belt means defining and forming a path of container travel commencing substantially in advance of such tangent contact of the article wih the vacuum drum and terminating substantially beyond such contact, whereby each container is caused to travel linearly at the desired speed and to spin about its cylinder axis at a desired speed without substantial acceleration or deceleration until such segment is firmly applied to the cylindrical article.

10. A method of applying segments of film or sheet material to the cylinder surfaces of cylindrical articles which comprises:

(a) providing a cylindrical vacuum drum capable of receiving such segments successively at a segment receiving station, holding each segment on its cylinder surface and transporting the thus held segment, by rotation of the drum about its cylinder axis, to a segment applying station

(b) operating said vacuum drum as set forth in step (a)

(c) transporting such cylindrical articles in succession with their cylinder axes parallel to the cylinder axis of the vacuum drum, such transporting being through a straight line path from a first location to a second location, such path being so positioned that between the first location and second location each container is brought into tangent contact with the leading end of a segment on the drum, such contact occurring a substantial distance from the first location and from the second location and

(d) imparting to each container while it is being transported from the first location to the second location a spinning motion about its cylinder axis,

whereby each segment, in turn, is released by the vacuum drum, picked up by the container and wrapped around the container at least partially while the container is undergoing simultaneous linear movement and spinning motion.

4,931,123

HEAT-SENSITIVE COLOR TRANSFER RECORDING MEDIUM

Hideo Makishima, Tokyo, Japan, assignor to Mitsubishi Paper Mills, Ltd., Tokyo, Japan

Filed Jan. 19, 1988, Ser. No. 145,097

Claims priority, application Japan, Jan. 23, 1987, 62-14930

Int. Cl.[5] B41M *5/26*

U.S. Cl. 156—234 **7 Claims**

1. A heat-sensitive color transfer recording medium comprising a substrate and hot-melt inks of a plurality of different colors including yellow in series applied onto one side of the substrate, the yellow hot-melt ink comprising 81 to 92% by weight of a solid wax, 2 to 13% by weight of a resin and 6 to 9% by weight of a yellow pigment said yellow hot-melt ink being used as a first color for printing.

7. In a process for printing a colored image on an image-receiving sheet by using a heat-sensitive color transfer recording medium, and transferring a yellow hot-melt ink first, followed by transferring other hot-melt inks, the improvement wherein the yellow hot-melt ink on the heat-sensitive color transfer recording medium comprises 81 to 92% by weight of a solid wax, 2 to 13% by weight of a resin and 6-9% by weight of a yellow pigment.

4,931,124

METHOD OF MAKING VENEER LAMINATE COMPOSITE STRUCTURE

Charles S. Baum, St. Clair Shores, Mich., assignor to Xylem Technologies, Inc., Traverse City, Mich.

Division of Ser. No. 710,869, Mar. 12, 1986, Pat. No. 4,689,257, Division of Ser. No. 710,870, Mar. 12, 1986, Pat. No. 4,615,936, which is a continuation-in-part of Ser. No. 649,215, Sep. 10, 1984, Pat. No. 4,543,284. This application Oct. 6, 1986, Ser. No. 915,721

Int. Cl.[5] B32B *31/20*

U.S. Cl. 156—245 **15 Claims**

1. A method of remanufacturing wood comprising the steps of:

A. peeling a bolt of natural wood in spiral form to form a web of wood veneer;

B. forming the wood veneer web into a first plurality of sheets of uniform size;

C. forming a second plurality of sheets, each having a size and thickness approximately the size and thickness of said wood veneer sheets, said second plurality of sheets comprising at least one sheet of fiberglass and at least one sheet

of core material having a grain strength running in a direction generally normal to the plane of that sheet; and

D. intermixing said wood veneer sheets and said second plurality of sheets while interposing resin between said intermixed sheets to form a wood sandwich structure comprising a sheet of core material with a sheet of fiberglass resin bonded to each face of said sheet of core material and a sheet of veneer resin bonded to the exposed face of each sheet of fiberglass.

4,931,125

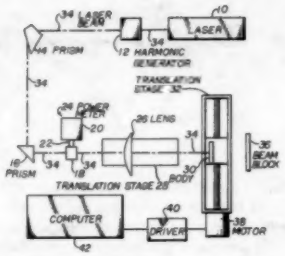
METHOD FOR ADHESIVE BONDING WITH PRETREATMENT OF COMPONENTS

Curtis L. Volkmann; John J. Kester, and Gregory A. Stevens, all of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 746,170, Jun. 18, 1985, abandoned, and a continuation-in-part of Ser. No. 876,029, Jun. 18, 1986, abandoned. This application Oct. 16, 1987, Ser. No. 109,669

Int. Cl.[5] B32B *31/28*

U.S. Cl. 156—272.8 **28 Claims**



1. A method for adhesively bonding a first body to a second body, the first body having a non-metallic substrate, the method comprising a step of pretreating an area of the first body; a step of applying an adhesive agent, the adhesive agent being applied to either the pretreated area of the first body, an area of the second body, or to both the pretreated area of the first body and an area of the second body; and then joining the pretreated area of the first body with the second body so that the adhesive agent is interposed between the pretreated area of the first body and the area of the second body, the improvement which comprises as the step of pretreating an area of the first body:

placing the first body in the path of an energy beam having a selected energy density for a duration effective to form projections on the non-metallic substrate of the first body, the projections formed substantially by evaporation of the non-metallic substrate of the first body.

4,931,126

APPARATUS AND METHOD FOR JOINING A PLURALITY OF THERMOPLASTIC TAPES

Douglas A. McCarville, and Jeffrey A. New, both of Wichita, Kans., assignors to The Boeing Company, Seattle, Wash.

Filed Apr. 14, 1989, Ser. No. 338,183

Int. Cl.[5] B29C *65/00, 65/08*; B32B *31/04*

U.S. Cl. 156—304.6 **13 Claims**

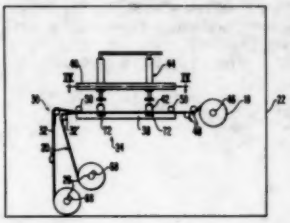
13. A seaming method of producing a continuous sheet of thermoplastic material of a selected width from thermoplastic tapes wound on a plurality of rolls, comprising the steps of:

rotatably mounting the rolls of tapes on a frame;

threading the tapes through an alignment means for aligning the tapes in a selected one of an abutting seam structure and an overlapping seam structure;

using a driving means for applying tension to the tapes to feed the tapes at a constant speed into a seaming zone;

applying a specific pneumatic pressure on the tapes responsive to the material composition of the tapes and the seaming operation speed



thermally joining the tapes to form the continuous sheet of thermoplastic material; and

winding the continuous sheet of thermoplastic material on a take-up roll means controllable by said driving means.

4,931,127

LABELLING SYSTEM

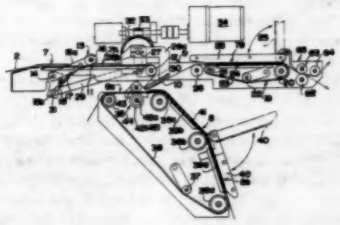
Mitsuo Matsumoto, Hyogo, Japan, assignor to Kanzaki Seishi Company, Tokyo, Japan

Filed Jan. 17, 1989, Ser. No. 297,942

Claims priority, application Japan, Feb. 8, 1988, 62-27035; Feb. 8, 1988, 62-27036; Mar. 25, 1988, 62-72406

Int. Cl.[5] B65C *9/18*

U.S. Cl. 156—361 **16 Claims**



1. A labelling machine comprising a label conveying device which is adapted to carry substantially linearly in the direction of travel a label carrier strip provided with detachable labels at regular intervals, a post card conveying device located under the said label conveying device and which carries, in the direction opposite to the said direction of conveyance of labels, a post card carrier strip having post cards thereon onto which post cards the said labels are to be attached, and a label attaching device for automatically attaching to a post card, in the attaching position, the labels which are conveyed by the said label conveying device, wherein said label conveying device has a label conveying route comprised of an upstream side conveying route, and a downstream side conveying route, and a turning guide for said label carrier strip, said turning guide being adapted to move between a retiring position above the label conveying route and said attaching position close to the post card conveying device through an opening provided between said upstream side and said downstream side conveying routes.

4,931,128

ELECTRONIC PARTS PROCESSING MACHINE

Junichi Hamano, Hyogo, Japan, assignor to Takasago Electric Industry Co., Ltd., Osaka, Japan

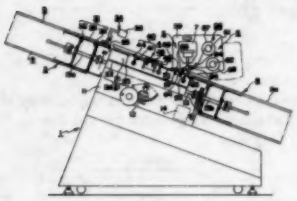
PCT No. PCT/JP88/00107, § 371 Date Aug. 15, 1988, § 102(e) Date Aug. 15, 1988, PCT Pub. No. WO88/05957, PCT Pub. Date Aug. 11, 1988

PCT Filed Feb. 4, 1988, Ser. No. 245,415

Claims priority, application Japan, Feb. 6, 1987, 62-26868; Mar. 19, 1987, 62-67537

Int. Cl.[5] B65C 9/40, 9/06

U.S. Cl. 156—362 22 Claims



1. An electronic parts processing machine for continuously processing and treating electronic parts comprising a carrier means supporting a linear carrying path means, aid electronic parts being carried linearly along said carrying path means, said carrier means being operable to feed said electronic parts one by one along said carrying path means to stop at work stations spaced from one another along said carrying path means, a supply means disposed upstream of said carrying path means and having a plurality of elongated supply tray supports for supporting a plurality of said electronic parts in aligned array, said supply means comprising a supply rotary means rotatable about a rotary axis which slopes downwardly relative to the horizontal, said supply rotary means having an outer periphery, said plurality of elongated supply tray supports being mounted on said outer periphery of said supply rotary means and a sloping downwardly in parallel to said rotary axis, said supply rotary means being rotatable about said rotary axis to different rotary positions such that in each rotary position one of said elongated supply tray supports is aligned with said carrying path, said supply means having feed control means for feeding said electronic parts one at a time onto said carrying path means as said electronic parts slide by their own weight along said aligned sloping tray support, a first and second processing means mounted on said carrier means at said work stations and operable to process and treat said electronic parts as said electronic parts are fed one by one along said carrying path means to stop at said work stations, a collection means disposed downstream of said carrying path means and having an elongated collection tray support for supporting a plurality of processed electronic parts in aligned array, said collection tray support being aligned with said carrying path means and being disposed to slope downwardly relative to horizontal such that said collection tray support receives said processed electronic parts one by one from said carrying path means and collects said processed electronic parts in aligned array as said electronic parts slide by their own weight along said sloping collection tray support.

4,931,129

CARPETS

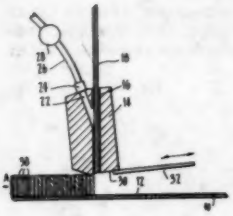
Ian G. Bartlett, Grovedale, and Donald A. Lymer, Highton, both of Australia, assignors to Tybar Engineering Pty., Ltd., Victoria, Australia

Continuation of Ser. No. 5,468, Jan. 20, 1987, abandoned, which is a division of Ser. No. 707,463, Mar. 1, 1985, Pat. No. 4,678,533. This application Jan. 9, 1989, Ser. No. 296,401

Claims priority, application Australia, Mar. 7, 1984, PG3952

Int. Cl.[5] D04H 11/08; D05C 15/06

U.S. Cl. 156—435 3 Claims



1. Apparatus for manufacturing tufted carpet of the type in which the ends of rows of yarn bits are implanted in an adhesive covering on a sheet of backing, said apparatus comprising:

a manifold comprising an elongated stationary body having upper and lower surfaces, said body extending across the width of an adhesive covered sheet of backing adapted to be moved stepwise under said body along a horizontal path spaced from said lower surface a fixed distance equal to a desired tuft height and in a direction of travel perpendicular to the width dimension of said sheet, said body having a plurality of guide bores extending substantially vertically therethrough between the upper and lower surfaces and uniformly distributed in a row along the length dimension of said body, each of said guide bores having a yarn outlet at said lower surface and being connected at said upper surface to a respective yarn supply for guiding yarn from a supply through a respective yarn outlet in the lower surface of said body in a direction substantially perpendicular to said sheet of backing;

first control means for controllably forcing yarn from respective yarn supplies through said guide bores comprising a like plurality of air channels formed in said body each leading into a respective guide bore and adapted for connection to a supply of compressed air through a first control valve operative to momentarily apply compressed air to said channels to force through each guide bore a respective strand of yarn of sufficient length that the free end of individual uncut yarns emerging from the yarn outlets in the lower surface of said body is embedded in the adhesive covering on said sheet of backing without the use of any vertically moving parts, and

yarn cutting means comprising a knife mounted for reciprocating engagement with the lower surface of said body and cooperating with said body and operative after the free ends of individual uncut yarns are embedded in said adhesive coating for simultaneously severing the plurality of yarns where they emerge from the yarn outlets in the lower surface of said body thereby to form a row of upstanding carpet tufts having a height substantially equal to

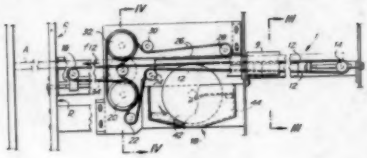
said fixed distance between the lower surface of said body and said path of travel of said sheet of backing.

4,931,130

APPARATUS FOR APPLYING ADHESIVE ON TUBULAR CORES FOR ROLLS OF WEB MATERIAL AND FOR FEEDING SAME CORES TO A WEB WINDING MACHINE

Guglielmo Biagiotti, Via Di Vorno, Italy, assignor to Perini Finanziaria, Lucca, Italy

Filed Aug. 25, 1988, Ser. No. 236,487
Claims priority, application Italy, Sep. 1, 1987, 9473 A/87
Int. Cl.[5] B65H *19/20*
U.S. Cl. 156—446 **6 Claims**



1. In an apparatus for convolutely winding of webs of sheet material onto a small diameter core,

means for feeding said core in an axial movement toward the apparatus,

means for feeding said sheet material toward said core orthogonally to the direction of movement of said core,

a core-receiving seat in said apparatus,

means for moving said core into said core-receiving seat of the apparatus, and

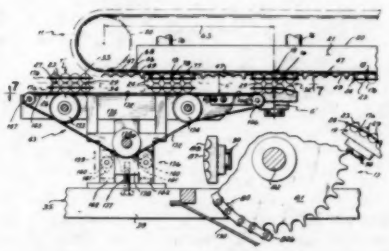
adhesive-applying means disposed along the axial path of the core and arranged to apply a single longitudinal strip of adhesive to said core prior to its insertion into said core-receiving seat.

4,931,131

PACKAGE COLLATOR MACHINE

Ralph F. Thompson, 5997 Woodridge Dr., Milford, Ohio 45150

Filed Jun. 2, 1989, Ser. No. 360,993
Int. Cl.[5] B65B *9/12;* **A21C** *15/00*
U.S. Cl. 156—556 **28 Claims**



1. A package collator machine comprising

a first package conveyor having a transfer section of a lesser conveyor length,

a second package conveyor having a transfer section of a greater conveyor length, said first and second package conveyors being juxtaposed to define common entry and exit points, each of said first and second conveyors being operable at the same line speeds to move plural packages through said transfer sections between said entry and exit points,

a feed conveyor located to supply the entry point of said first and second conveyors with multiple packages oriented in-line one after the other,

a series of active package seats fixed to one of said first and second conveyors,

a series of inactive package seats fixed to the other of said first and second conveyors,

a leading package of each successive in-line package pair being received in a seat fixed to one of said first and second conveyors and a trailing package of that same package pair being received in a seat fixed to the other of said first and second conveyors, and

a vacuum system connected with said active package seats, said vacuum system cooperating with those packages in seated relation on said active package seats to retain said packages thereon as said active seated packages move between said entry and exit points,

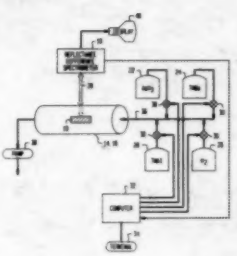
the difference between said lesser and greater conveyor lengths being at least equal to the length of said trailing package, and being such that said leading and trailing packages of each package pair are translated from in-line individualized orientation as received at said entry point of said first and second conveyors into face-to-face paired orientation at said exit point of said first and second conveyors.

4,931,132

OPTICAL CONTROL OF DEPOSITION OF CRYSTAL MONOLAYERS

David E. Aspnes, Watchung; Rajaram Bhat, Red Bank; Etienne G. Colas, Asbury Park; Leigh T. Florez, Atlantic Highlands; James P. Harbison, Fair Haven, and Amabrose A. Studna, Raritan, all of N.J., assignors to Bell Communications Research, Inc., Livingston, N.J.

Filed Oct. 7, 1988, Ser. No. 255,140
Int. Cl.[5] C30B *25/16, 23/02, 35/00;* **B05C** *11/00*
U.S. Cl. 156—601 **19 Claims**



10. A method of growing a crystal, comprising the steps of:

depositing atoms upon a surface of a substrate;

irradiating said substrate with light during said depositing step and causing said irradiated light to reflect resultant light in a first direction;

detecting in said first direction two respective quantities of orthogonal polarization components of said resultant light;

differencing said two quantities to produce an output representative of an amount of said atoms deposited upon said surface; and

controlling said depositing step in response to said output of said differencing step.

4,931,133

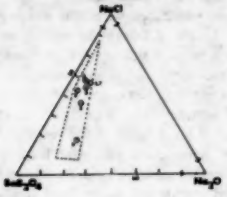
HIGH TEMPERATURE SOLUTION GROWTH OF BARIUM BORATE (β-BAB_2O_4)

Devlin M. Gualtieri, Ledgewood, and Bruce H. T. Chai, Bridgewater, both of N.J., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Continuation-in-part of Ser. No. 150,127, Jan. 29, 1988, abandoned. This application Dec. 21, 1988, Ser. No. 287,824

Int. Cl.[5] C30B 9/12

U.S. Cl. 156—621 **9 Claims**



1. The method of growing crystalline β—BaB_2O_4 from a fluxed melt, which comprises forming a melt comprising from about 31 to about 78 mol percent of BaB_2O_4, from about 1.5 to about 23 mol percent of Na_2O, and from about 7.5 to about 67 mol percent of NaCl, followed by cooling said melt to permit formation of crystalline β—BaB_2O_4.

4,931,134

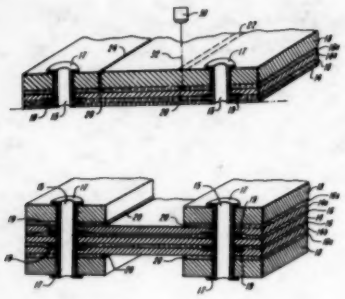
METHOD OF USING LASER ROUTING TO FORM A RIGID/FLEX CIRCUIT BOARD

Zvi Hatkevitz, Andover; Ken Maylor, Danvers, and Roland Jacques, Lowell, all of Mass., assignors to Parlex Corporation, Methuen, Mass.

Filed Aug. 15, 1989, Ser. No. 394,065

Int. Cl.[5] B44C 1/22; B29C 37/00; C03C 15/00; C23F 1/02

U.S. Cl. 156—630 **10 Claims**



1. A method of fabricating a multilayer circuit board having rigid and flexible sections, by Z-axis laser routing, comprising the steps of:

forming a rigid superstructure having a laminating surface and an opposing surface, said laminating surface having at least one strip of laser reflective material disposed thereon, said strips defining a boundary between the rigid and flexible sections of said multilayer circuit board;

providing a flexible substrate for lamination to said rigid superstructure;

applying an adhesive material to selective areas intermediate said rigid superstructure and the flexible substrate, said selective areas corresponding to a section designated to be rigid on said multilayer circuit board;

laminating said rigid superstructure to the flexible substrate forming a rigid laminate composite, wherein said strips of laser reflective material abut the flexible substrate;

directing laser energy at said rigid superstructure in alignment with said strips of laser reflective material, forming a laser routed channel through said rigid superstructure terminating at said strip of laser reflective material, said channel defining an interface between said rigid and flexible sections on said multilayer circuit board; and

removing selected sections of said rigid superstructure between said laser routed channels to expose selected sections of the flexible substrate, forming said multilayer circuit board having rigid and flexible sections.

4,931,135

ETCHING METHOD AND ETCHING APPARATUS

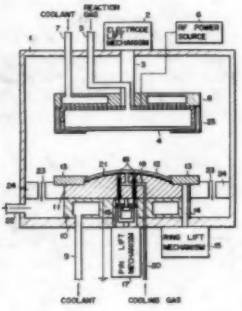
Takao Horiuchi, Fuchu; Izumi Arai, Yokohama, and Yoshifumi Tahara, Yamato, all of Japan, assignors to Tokyo Electron Limited, Tokyo, Japan

Filed Dec. 21, 1988, Ser. No. 287,156

Claims priority, application Japan, Dec. 25, 1987, 62-333613; Jan. 25, 1988, 63-14195; Jan. 25, 1988, 63-14196; Jan. 25, 1988, 63-14197; Feb. 9, 1988, 63-29792; Mar. 7, 1988, 63-53280

Int. Cl.[5] B44C 1/22; H01L 21/306; C23F 1/00; C03C 15/00

U.S. Cl. 156—643 **21 Claims**



10. An etching method comprising the steps of:

setting in a vacuum vessel an electrode having a projecting mounting surface consisting of a curved surface identical to a curved surface deformed when an object to be processed is subjected to a uniform load;

mounting the object to be processed in contact with the mounting surface by urging means;

arranging a counter electrode to be opposed to said electrode at a predetermined interval;

supplying a process gas in said vacuum vessel;

applying a predetermined voltage between said electrode and said counter electrode to convert the process gas into a plasma; and

performing etching of said object to be processed by the process gas in a plasma state.

4,931,136

METHOD AND APPARATUS FOR MANUFACTURING A METAL CONTACT WITH OVERHANGING EDGES

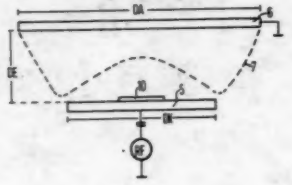
Thomas Pausch, Freising, and Josef Willer, Riemerling, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Aug. 7, 1989, Ser. No. 390,642

Claims priority, application Fed. Rep. of Germany, Aug. 5, 1988, 3826733

Int. Cl.[5] B44C *1/22;* **C23F** *1/02;* **C03C** *15/00, 25/06*

U.S. Cl. 156—643 **8 Claims**



1. In a method for the manufacture of a metal contact having overhanging upper edges, said metal contact being situated on a semiconductor layer structure on a substrate, wherein said metal contact comprises at least one specific metal layer of uniform composition tapering toward the surface of the semiconductor layer structure, wherein the overhanging of the upper edges of said metal contact is effected by the taper of the specific metal layer, the improvement comprising:

forming said metal contact by reactive ion etching (RIE) and mask technology in which said substrate is applied on a cathode and;

effecting RIE such that an equipotential surface forms a boundary between a positive column and a dark field zone, said equipotential surface being concavely curved with respect to said substrate.

4,931,137

PROCESS FOR PRODUCING MUTUALLY SPACED CONDUCTOR ELEMENTS ON A SUBSTRATE

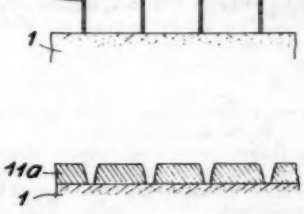
Henri Sibuet, Saint Egreve, France, assignor to Commissariat a l'Energie Atomique, Paris, France

Filed Nov. 17, 1987, Ser. No. 121,678

Claims priority, application France, Dec. 28, 1986, 86 16651

Int. Cl.[5] H01L *21/00, 21/283, 21/308*

U.S. Cl. 156—656 **4 Claims**



1. Process for the production of mutually spaced elements (**11***a*, **13***a*) on a substrate (**1**), comprising a first stage of producing on the substrate spacers (**10**), which are perpendicular to the substrate and whereof the dimensions and spacings are a function of the dimensions and spacings of the elements (**11***a*, **13***a*) to be produced,

said spacers (**10**) having parallel side walls and a width less than 1 micrometer, a second stage of depositing anisotropically a first material forming elements (**11***a*) on said substrate (**1**) in a direction perpendicular to its surface, wherein a deposit (**11***b*) is produced on the heads of spacers (**10**) which prevents the deposit of said first material on the walls of the spacers,

a third stage of depositing anisotropically perpendicular to the surface of the substrate a second material on the deposited first material so that said second material covers the upper surface of the first deposited material, and, using the second material as a mask, selectively etching the first material to remove it at least from the bases of the spacers and thereafter removing the spacers.

4,931,138

METHOD AND APPARATUS FOR MANUFACTURING OPTICAL CARD

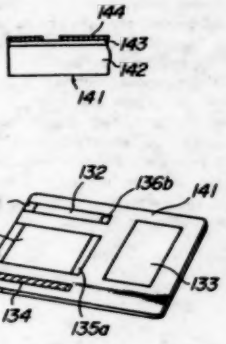
Akihiko Hashimoto, Hachioji, Japan, assignor to Olympus Optical Co. Ltd., Japan

Filed Dec. 29, 1988, Ser. No. 291,239

Claims priority, application Japan, Jan. 12, 1988, 63-3142; Feb. 25, 1988, 63-40603; Aug. 16, 1988, 63-202731; Aug. 20, 1988, 63-205669

Int. Cl.[5] B44C *1/22;* **C23F** *1/02;* **C03C** *15/00;* **B29C** *37/00*

U.S. Cl. 156—659.1 **24 Claims**



1. In a method of manufacturing an optical card having a transparent base, a first optical member applied on the base and having a first reflectivity, and a photosensitive layer applied on the first optical member by exposing the photosensitive layer with light modulated in accordance with a data signal to be recorded, removing selectively the first optical member with the aid of the exposed photosensitive layer, and applying on the first optical member a second optical member having a second reflectivity different from the first reflectivity, the improvement being characterized in that:

said photosensitive layer is simultaneously exposed with a plurality of light beams emitted from a plurality of light sources and modulated in accordance with the data signal by means of a plurality of optical fibers.

4,931,139

DEGRADABLE ABSORBENT MATERIAL AND MANUFACTURING PROCESS THEREFOR

Christopher R. Phillips, Bellingham, Wash., assignor to Absorption Corp., Bellingham, Wash.

Continuation-in-part of Ser. No. 139, Jan. 2, 1987. This application Dec. 31, 1987, Ser. No. 236,678

Int. Cl.[5] D21H *11/16*

U.S. Cl. 162—100 **22 Claims**

1. A process for forming a degradable particulate absorbent material having not more than 30% inorganic solids content by weight and comprising the steps of:

a. obtaining waste cellulose fiber material having not more than 30% inorganic solids content by weight with a total dry solids content ranging from approximately 20% to approximately 50% by weight;

b. rehydrating the waste cellulose fiber material to produce a water/fiber slurry comprising on the order of about 96.5% water by weight and about 3.5% total solids by weight;

c. adding a water insoluble latex emulsion to the slurry produced in Step (a) in an amount ranging from about 0.5% to about 5.0% of the total dry solids by weight in the slurry;

d. dewatering the slurry to form a shreddable press cake;

e. particulating the press cake by means of a shredding device to form discrete particles;

f. conditioning the discrete particles produced in Step (e) by imparting a tumbling motion to such particles in the presence of a water mist; and,

g. drying the conditioned discrete particles to produce a generally flat planar particulate to produce a generally flat planar particulate absorbent medium ranging from 80% total dry solids by weight to 92% total dry solids by weight and having not more than 30% inorganic solids content by weight.

4,931,140

METHOD AND A DEVICE FOR CUTTING A WEB IN A PAPER MACHINE BY MEANS OF A WATER JET

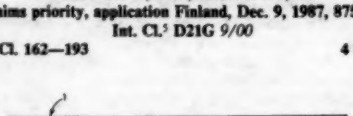
Pentti T. Peltola, and Jounj R. R. Berggvist, both of Anjala, Finland, assignors to Oy Tampella AB, Tampere, Finland

Filed Nov. 30, 1988, Ser. No. 277,696

Claims priority, application Finland, Dec. 9, 1987, 875412

Int. Cl.[5] D21G *9/00*

U.S. Cl. 162—193 **4 Claims**



1. A method of cutting, by means of a water jet, an edge strip in a web passing over a felt or wire in a paper machine for the threading of the web, whereby the end of the web is passed through the paper machine by means of the edge strip cut in the web, the edge strip being narrower than the web, said method comprising moving a cutting water jet back and forth across the direction of travel of the web for preventing the felt or wire from getting excessively wet and from being choked during the cutting of the edge strip, the edge strip so obtained varying in width.

4,931,141

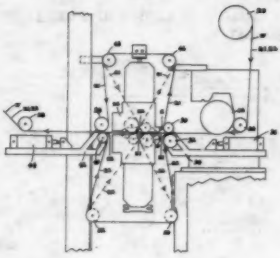
PAPER TAILING DEVICE

David J. Shafranski, Stevens Point, Wis., assignor to Consolidated Papers, Inc., Wisconsin Rapids, Wis.

Filed Jul. 6, 1989, Ser. No. 376,239

Int. Cl.[5] D21F *7/00*

U.S. Cl. 162—255 **16 Claims**



7. A paper making machine, comprising a plurality of rotating rolls across which a paper web passes in moving through said machine; a gap in the path of travel of the web through said machine; overlapping carrier ropes that extend and move alongside the path of travel of the web through said machine, said carrier ropes, upon a paper web initially being guided through said machine, receiving between them a side edge of an initial portion of the web to guide the initial portion through said machine; and a paper tailing device for transferring the initial portion of the web across said gap during guiding of the web through said machine, said paper tailing device comprising a pair of upstream sheaves on an upstream side, with respect to the direction of web travel, of said gap; a pair of downstream sheaves on a downstream side of said gap, said carrier ropes extending over said upstream and downstream pairs of sheaves and defining an outgoing nip from said ropes at said upstream pair of sheaves and an incoming nip to said ropes at said downstream pair of sheaves; and means for moving said upstream and downstream pairs of sheaves relative to and toward each other, during guiding of the initial portion of the web through said machine, to place said outgoing and incoming nips in close facing relationship so that a leading side edge of the initial portion of the web, upon exiting said outgoing nip from said carrier ropes, is introduced into said incoming nip to said carrier ropes and thereby transferred across said gap, and for moving said upstream and downstream pairs of sheaves relative to and away from each other and to opposite sides and outside of said gap after completion of guiding the web through said machine.

4,931,142

LONG-NIP ROLL PRESS WITH ECCENTRIC TRAVEL PATH OF PRESS SHELL

Karl Steiner, Herbrechtingen; Josef Müllner, Heidenheim; Christian Schiel, Heidenheim, and Hans Flämig, Heidenheim, all of Fed. Rep. of Germany, assignors to J. M. Voith GmbH, Fed. Rep. of Germany

Filed Mar. 7, 1988, Ser. No. 164,542

Claims priority, application Fed. Rep. of Germany, Mar. 13, 1987, 3708189

Int. Cl.[5] D21F *3/08*

U.S. Cl. 162—358 **11 Claims**

1. A long-nip roll press comprising:

pedestal means;

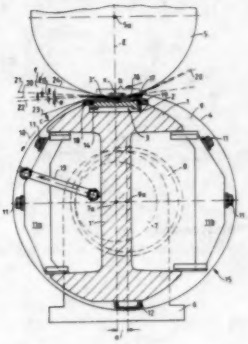
a support member having a central axis and supported on said pedestal means; and a mating roll having a central axis; said central axes defining a press plane;

a flexible inflatable tubular press shell; means for feeding air into said press shell;

a pair of support disks, each having a central axis, mounted on said support member for rotatably supporting said press shell in a path of travel about a central axis of said press shell; said support member being within said press shell;

said support disks each being rotatably mounted on said support member and coaxial with said central axis of said press shell; said press shell being symmetrically secured at its ends to said support disks;

a press shoe mounted on the support member substantially



symmetrically to the press plane; means for displacing said press shoe radially outwardly against an inside surface of said press shell, for pressing said press shell against said mating roll; said press shoe, press shell and mating roll thereby forming an areal press nip between the press shell and the mating roll;

guide means for guiding a web to be dewatered and at least one felt dewatering belt in a web travel direction through said areal press nip for dewatering said web;

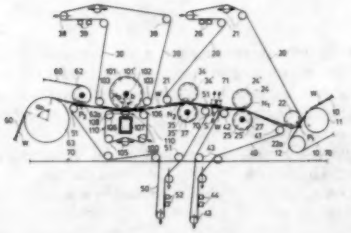
said central axis of said support disks and said press shell being offset from said press plane in a direction opposite said web travel direction; whereby said travel path of said press shell is eccentric to said press plane.

4,931,143

PRESS SECTION WITH SEPARATE PRESS NIPS IN A PAPER MACHINE

Mikko Karvinen, Vihtavuori, and Jorma Laapotti, Palokka, both of Finland, assignors to Valmet Oy, Finland

Filed May 20, 1985, Ser. No. 735,947
Claims priority, application Finland, May 25, 1984, 842115
Int. Cl.[5] D21F *3/04*
U.S. Cl. 162—360.1 **7 Claims**



1. In a press section of a paper machine including, in the direction of run of a web through the press section, at least first, second and third successive separate press nips having respective nip zones for removing water from the web, the web running between said nips in a closed draw, and wherein dewatering takes place through both faces of the web in at least said first press nip, said first press nip being formed by two hollow-faced rolls, said second press nip being formed by a separate pair of press rolls, said press section further including upper and lower fabrics, and wherein first upper and lower fabrics in the direction of web run are water-receiving press fabrics, one of said first upper and lower fabrics constituting a press fabric only in said first press nip and the other of said first upper and lower fabrics constituting a press fabric both in said first press nip and in said second press nip, and where second upper and lower fabrics in the direction of web run include a second upper water-receiving press fabric and a second lower substantially non-water receiving transfer fabric or belt on which the web is transferred from said third press nip to a drying section of the paper machine, the improvement comprising:

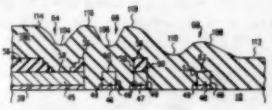
said third press nip is formed by an extended-nip press, said nip zone of said third press nip being substantially longer than the lengths of said nip zones of said first and second press nips, and wherein said second lower substantially non-water receiving transfer fabric supports a bottom side of the web and said second upper water-receiving press fabric is pressed against a top side of the web as the web passes through said third extended-nip press, said extended-nip press further comprising an upper hollow-faced roll acting on said second upper water-receiving press fabric, a looped impervious belt, a lower press shoe situated within the loop of said impervious belt, said impervious belt transmitting pressure directed by said press shoe at said nip zone of said third press nip through said substantially non-water receiving fabric, and means for driving said upper press roll, and wherein said transfer fabric constitutes means for transferring the web after said third nip as a closed draw to the drying section of the paper machine.

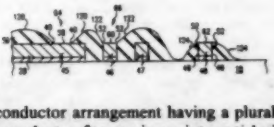
4,931,144

SELF-ALIGNED NONNESTED SLOPED VIA

Jeffrey E. Brighton, Katy, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Division of Ser. No. 80,116, Jul. 31, 1987, Pat. No. 4,842,991.
This application May 8, 1989, Ser. No. 349,020
Int. Cl.[5] H05K *1/00*
U.S. Cl. 174—262 **7 Claims**





1. A semiconductor arrangement having a plurality of vias formed to a conductor for use in an integrated circuit, said semiconductor arrangement comprising:

a conductor formed on one side of a support layer, sides of said conductor extending outward from said support layer and defining a boundary of an upper surface of said conductor, said sides substantially parallel to each other and said upper surface substantially parallel to said support layer;

a first insulator layer patterned on said upper surface of said

conductor to define exposed areas on said conductor not covered by said first insulator layer;

a second insulator layer formed over said first insulator layer, said exposed areas and sidewalls of said exposed areas;

said vias of said semiconductor arrangement having respective bottoms formed by said exposed areas and respective sidewalls formed by said first and second insulator layers, said sidewalls sloping from said respective bottoms at approximately 60° or less.

4,931,145

SEPARATION OF BENZENE FROM ACETONE BY AZEOTROPIC DISTILLATION

Lloyd Berg, 1314 S. Third Ave., Bozeman, Mont. 59715, assignor to Lloyd Berg, Bozeman, Mont.

Filed Oct. 16, 1989, Ser. No. 421,825

Int. Cl.[5] B01D *3/36*; C07C *7/06, 45/84*

U.S. Cl. 203—69 **10 Claims**

1. A method for recovering acetone from a mixture of acetone and benzene which comprises distilling a mixture of acetone and benzene in a rectification column in the presence of an azeotrope forming agent, recovering the acetone and the azeotrope forming compound as overhead product, obtaining the benzene from the stillpot, wherein said azeotrope forming agent is an aromatic hydrocarbon containing seven to twelve carbon atoms.

4,931,146

PROCESS FOR OBTAINING HIGH-PURITY BISPHENOL A

Shigeru Iimuro; Yoshio Morimoto, and Takashi Kitamura, all of Aichi, Japan, assignors to Mitsui Toatsu Chemicals, Inc., Tokyo, Japan

Filed Mar. 28, 1989, Ser. No. 329,867

Claims priority, application Japan, Apr. 5, 1988, 63-83905

Int. Cl.[5] B01D *3/04, 3/10*

U.S. Cl. 203—92 **3 Claims**

1. A process for obtaining high-purity bisphenol A which comprises removing a major portion of phenol from an adduct of bisphenol A with phenol so that the weight ratio of phenol to bisphenol A is from 0.01:1 to 0.1:1 and then removing continuously the residual phenol by steam stripping in a multitubular packed column wherein the bisphenol A and steam are supplied to the interior of a plurality of packed tubes wherein the weight ratio of steam to bisphenol A is 0.01:1 to 1:1 so that the concentration of phenol in the high purity bisphenol A is less than about 0.01% by weight.

4,931,147

METHOD OF MANUFACTURING A METAL MATRIX

Petrus E. J. Legierse, and Gustaaf H. A. van der Hoorn, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

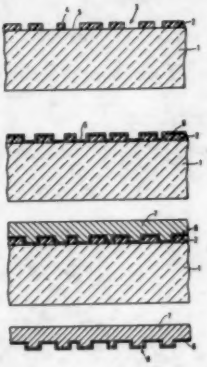
Filed Aug. 29, 1989, Ser. No. 400,257

Claims priority, application Netherlands, Sep. 8, 1988, 8802211

Int. Cl.[5] C23C *18/18*

U.S. Cl. 204—5 **4 Claims**

1. A method of manufacturing a metal matrix which comprises an information track on at least one side, in which a master disk comprising a photoresist layer in which an information track has been provided on the side of the photoresist layer is provided in an electroless nickel-plating bath with a nickel layer on which a metal layer is electrodeposited and the resulting metal shell in which the information track of the photoresist layer has been copied, is separated from the master disk, characterised in that, before the electroless nickel layer is



provided, the surfaces to be nickel-plated are treated successively with a detergent and solution of aminosilane.

4,931,148

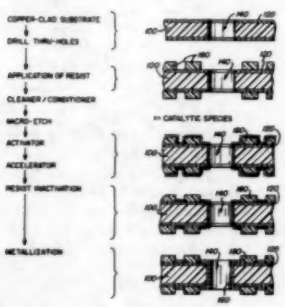
METHOD FOR MANUFACTURE OF PRINTED CIRCUIT BOARDS

Peter E. Kukanskis, Woodbury, and Harold Rhodenizer, Bethlehem, both of Conn., assignors to MacDermid, Incorporated, Waterbury, Conn.

Continuation of Ser. No. 893,626, Aug. 6, 1986, abandoned. This application Sep. 27, 1988, Ser. No. 250,991

Int. Cl.[5] C25D *5/56*

U.S. Cl. 204—15 **9 Claims**



1. A method for metallizing thru-holes formed in a metal-clad printed circuit board substrate material and for providing at the same time additional metallization of selected metal-clad surfaces of said metal-clad printed circuit board substrate material, comprising the steps of:

(a) providing a metal-clad printed circuit board substrate material having one or more thru-holes therein;

(b) applying a resist which is strippable in aqueous alkaline medium to selected surfaces of said metal-clad printed circuit board substrate material in a predetermined pattern to define those surfaces areas, over which resist is applied, where additional metallization is not desired;

(c) thereafter contacting said metal-clad printed circuit

board substrate material, having said patterned resist thereon, with a conditioner;

(d) thereafter contacting said conditioned metal-clad printed circuit board substrate material, having said patterned resist thereon, with a microetchant;

(e) thereafter contacting said conditioned and micro-etched metal-clad printed circuit board substrate material, having said patterned resist thereon, with catalytic species which promote metallization, resulting in the provision of said catalytic species on thru-hole surfaces, resist surfaces and the surfaces of said metal-clad printed circuit board substrate material not covered by said resist;

(f) thereafter contacting at least said resist surfaces of said metal-clad printed circuit board substrate material with an aqueous alkaline deactivating solution under conditions which substantially inactivate said resist surfaces to metallization without substantially removing the resist surfaces and without inactivating said thru-hole surfaces and the surfaces of said metal-clad printed circuit board substrate material not covered by said resist; and

(g) thereafter immersing said metal-clad printed circuit board substrate material, having said patterned resist thereon, in a metallizing solution effective to metallize said thru-hole surfaces and the surfaces of said metal-clad printed circuit board material not covered by said result, with substantially no metallization occurring on said resist surfaces.

4,931,149

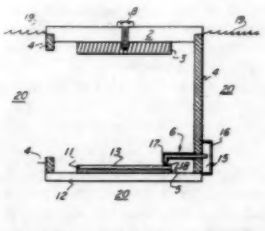
FIXTURE AND A METHOD FOR PLATING CONTACT BUMPS FOR INTEGRATED CIRCUITS

Roger J. Stierman, Richardson, and Robert J. Lessard, Garland, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation-in-part of Ser. No. 37,760, Apr. 13, 1987, Pat. No. 4,861,452. This application Jan. 10, 1989, Ser. No. 295,684

Int. Cl.[5] C25D 5/02

U.S. Cl. 204—15 **7 Claims**



1. A method of plating bumps on metallization on the face of a wafer, comprising the steps of:

(a) placing a wafer face up on a pad in a bump plating fixture so that the back of the wafer abuts the pad, a face of the wafer to be plated is coplanar a face of a base plate in the fixture and the wafer is disposed below an anode in the fixture;

(b) placing a cathode needle against the metallization on the face of the wafer to effect electrical contact action with the metallization; and

(c) creating relative motion between a plating bath and the face of the wafer to be plated.

4,931,150

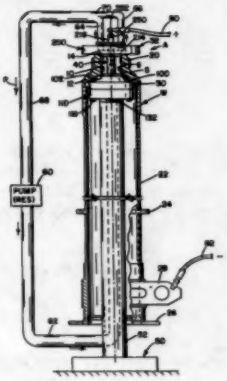
SELECTIVE ELECTROPLATING APPARATUS AND METHOD OF USING SAME

Gary W. Smith, North Olmsted, Ohio, assignor to SIFCO Industries, Inc., Cleveland, Ohio

Division of Ser. No. 174,431, Mar. 28, 1988, Pat. No. 4,853,099. This application May 8, 1989, Ser. No. 348,504

Int. Cl.[5] C25D 7/04

U.S. Cl. 204—26 **9 Claims**



1. An electroplating method for rapidly depositing a metal onto a selected surface of a workpiece, said method comprising the steps of

(a) providing an anode having an active surface with a selected shape to combine with said selected surface of said workpiece to define an elongated gap of at least 0.050 inches;

(b) supporting said anode in a fixed position to define said elongated gap;

(c) forcing an electroplating solution with metal cations through said gap at a velocity to exchange electroplating solution in said gap at a rate of at least 25 times per minute; and,

(d) applying current flow between said selected workpiece surface and the active surface of said anode through said gap at a current density in excess of 2.0 amperes/in^2.

4,931,151

METHOD FOR TWO STEP ELECTROLYTIC COLORING OF ANODIZED ALUMINUM

Kollengode V. Srinivasan, Marietta, Ga.; Leo P. Herrington, Walker, Mich.; Mores A. Bamly, Marietta, Ga., and Harold W. Poulsen, Fort Wayne, Ind., assignors to Novamax Technologies Holdings Inc., Ontario, Canada

Filed Apr. 11, 1989, Ser. No. 336,114

Int. Cl.[5] C25D 11/22

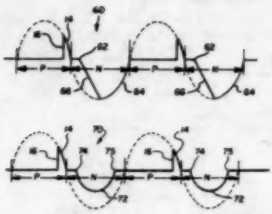
U.S. Cl. 204—376 **8 Claims**

1. In a two-step process for the electrolytic coloring of anodized aluminum, using an electrode and the anodized aluminum immersed in an electrolyte, including first anodizing the aluminum to provide an oxidized film on its surface, an improved second coloring step comprising:

providing a modified sinusoidal voltage waveform, including providing a sinusoidal waveform having a respective positive and negative one-half cycle sinusoidal portion, and modifying the sinusoidal waveform to provide the negative one-half cycle portion having, (1) a leading edge rise time which is substantially longer than the leading edge rise time of the positive one-half cycle portion, and

(2) an average voltage which is greater than the average voltage of the positive one-half cycle portion; and

applying said modified sinusoidal voltage waveform to said



anodized aluminum and the electrode to color the oxidized film while providing good throwing power, good coloring speed, good color uniformity, good electrode dissolution and with the capability to subtract color.

4,931,152

METHOD FOR IMPARTING EROSION-RESISTANCE TO METALLIC SUBSTRATE

Subhash K. Naik, Milford, and Louis J. Fiedler, Trumbull, both of Conn., assignors to Avco Corporation, Providence, R.I.

Division of Ser. No. 865,138, May 20, 1986, Pat. No. 4,741,975. This application Apr. 11, 1988, Ser. No. 145,036

Int. Cl.[5] C25D *5/00*; C23C *14/34, 16/00*; B05D *1/18*

U.S. Cl. 204—38.5 **12 Claims**

1. A method for imparting erosion-resistance to a metallic substrate without an attendant loss in the fatigue life of the substrate which comprises applying to the substrate a first ductile layer having a thickness between about 0.1 and 1.5 mils comprising palladium, or platinum in direct contact with the substrate and then applying at substantially low temperatures within the range of about 200° C. to about 700° C. second and third layers which overcoat the first layer, the second layer having a thickness between about 0.5 and 1.5 mils and being comprised of substantially pure tungsten; the third layer having a thickness between about 0.2 and 3 mils and being comprised of a material formed of a tungsten-carbon alloy or a material formed of a tungsten matrix having dispersed tungsten-carbon phases therein, the first layer capable of retaining substrate integrity and preventing diffusion of material from the third layer into the substrate.

4,931,153

ELECTROLYTIC TREATMENT OF RADIOACTIVE LIQUID WASTE TO REMOVE SODIUM

Katsuyuki Otsuka; Yoshiharu Takahashi, both of Tokai, and Hideaki Tamai, Fukuoka, all of Japan, assignors to Doryokuro Kakunenryo Kaihatsu Jigyodan, Tokyo, Japan

Filed Aug. 18, 1988, Ser. No. 233,625

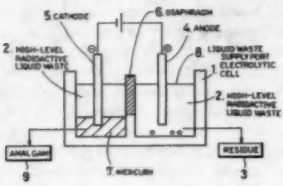
Claims priority, application Japan, Aug. 21, 1987, 62-207569

Int. Cl.[5] C25D *3/66*

U.S. Cl. 204—39 **3 Claims**

1. A process for electrolytically treating a radioactive liquid waste containing sodium compounds, comprising the steps of:

electrolyzing said radioactive liquid waste while using mercury as a cathode, so as to separate said liquid waste into an amalgam of metals including sodium and residue;



separating mercury from said amalgam; and

solidifying said residue.

4,931,154

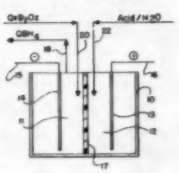
PRODUCTION OF METAL BOROHYDRIDES AND ORGANIC ONIUM BOROHYDRIDES

Cecil H. Hale, and Hossein Sharifian, both of Austin, Tex., assignors to Southwestern Analytical Chemicals, Inc., Austin, Tex.

Filed Jul. 17, 1989, Ser. No. 380,997

Int. Cl.[5] C25B *1/00, 3/04*

U.S. Cl. 204—59 R **47 Claims**



1. A process for preparing metal borohydrides and organic onium borohydrides in an electrolysis cell which comprises an anolyte compartment containing an anode and a catholyte compartment containing a cathode, the anolyte and catholyte compartments being separated from each other by a divider, said process comprising

(A) charging an anolyte comprising an aqueous solution of at least one acid to the anolyte compartment;

(B) charging a catholyte comprising an aqueous solution prepared from a metal boron oxide or an organic onium boron oxide to the catholyte compartment;

(C) passing a current through the electrolysis cell to produce the metal borohydride or an organic onium borohydride in the catholyte compartment; and

(D) removing at least a portion of the catholyte from the catholyte compartment.

4,931,155

ELECTROLYTIC REDUCTIVE COUPLING OF QUATERNARY AMMONIUM COMPOUNDS

John S. Dutcher; Hossein Sharifian, and Alan R. Tanner, all of Austin, Tex., assignors to Southwestern Analytical Chemicals, Inc., Austin, Tex.

Filed May 19, 1989, Ser. No. 354,623

Int. Cl.[5] C25B *3/00*

U.S. Cl. 204—72 **32 Claims**

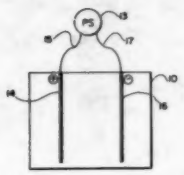
1. A process for the electrolytic reductive coupling of quaternary ammonium compounds to themselves or to other reactive organic compounds, said quaternary compounds being characterized by the formula

$$[(R^1)_3N^+—R^2]_aY^{-a} \quad (I)$$

wherein each R^1 is independently an alkyl group containing

from 1 to about 10 carbon atoms, a hydroxyalkyl or alkoxyalkyl group containing from 2 to about 10 carbon atoms, an aryl group, or two of the R^1 groups together with the nitrogen atom form a heterocyclic group, provided that if the heterocyclic group contains a —C=N— group, the third R^1 group is the second bond; R^2 is a hydrocarbyl group containing olefinic unsaturation, or a hydrocarbyl group containing a substituent which is electrolytically reactive or removable under the conditions of the process; Y^- is an anion; and a is equal to the valence of Y; which process comprises

(A) providing an electrolytic cell comprising an anode and a cathode;



(B) charging into the electrolytic cell, an aqueous solution containing a proton source, at least one of said quaternary ammonium compounds (I), and, optionally, at least one other organic compound capable of reacting with the quaternary ammonium compound (I) under the conditions of the reaction;

(C) passing an electric current through the electrolytic cell to reductively couple the quaternary ammonium compound to itself or to the other organic compound; and

(D) recovering the solution containing the coupled product from the electrolytic cell.

4,931,156

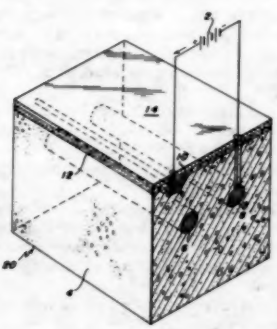
DISTRIBUTIVE ANODE COATING

James P. Dowd, Louisville; Charles C. Boyer, Prospect, both of Ky., and Gary W. Gardner, Elizabeth, Ind., assignors to Duochem, Inc., Boucherville, Canada

Filed Apr. 19, 1984, Ser. No. 601,932

Int. Cl.[5] C23F *13/00*

U.S. Cl. 204—147 **15 Claims**



1. In a method for cathodically protecting steel reinforcing bars which are embedded in concrete comprising (a) connecting the negative pole of a direct current source to the embedded reinforcing bars, (b) connecting the positive pole of the direct current source to the exterior of the concrete containing the embedded reinforcing bars, the improvement comprising having a conductive anode coating on the surface of the concrete consisting essentially of a mixture of graphite and a polymer which is methyl methacrylate-butyl methacrylate copolymer, ethyl methacrylate homopolymer or isobutyl methacrylate homopolymer.

4,931,157

EPOXY RESIN ADVANCEMENT USING URETHANE POLYOLS AND METHOD FOR USE THEREOF

Joseph T. Valko, Pittsburgh; Joseph E. Plasynski, Arnold, and Robert D. Miller, Sewickley, all of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Feb. 18, 1988, Ser. No. 157,013

Int. Cl.[5] C25D *13/06*; C08L *63/00, 63/02*

U.S. Cl. 204—181.7 **18 Claims**

1. An ungelled reaction product of a polyepoxide and an active hydrogen-containing material at least two active hydrogens per molecule, characterized in that the active hydrogen-containing material serves as a chain extender for the polyepoxide and is selected from the class consisting of a hydroxyalkyl-substituted urethane in which an hydroxy group is in the beta position to the urethane group and an ethoxylated derivative of said hydroxyalkyl-substituted urethane including mixtures thereof wherein epoxy groups in the polyepoxide react with the active hydrogens in the hydrogen-containing material.

4,931,158

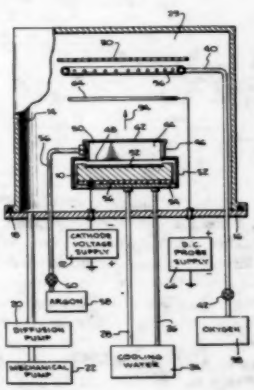
DEPOSITION OF FILMS ONTO LARGE AREA SUBSTRATES USING MODIFIED REACTIVE MAGNETRON SPUTTERING

Rointan F. Bunshah, Playa del Rey; Chandra V. Desphandey, Los Angeles, and Aziz A. Karim, Santa Monica, all of Calif., assignors to The Regents of the Univ. of Calif., Oakland, Calif.

Continuation of Ser. No. 171,789, Mar. 22, 1988, abandoned. This application Aug. 8, 1989, Ser. No. 391,740

Int. Cl.[5] C23C *14/34*

U.S. Cl. 204—192.29 **16 Claims**



7. A process for depositing a thin film onto a substrate by reactive magnetron sputtering comprising the steps of:

producing a primary plasma including material which is sputtered from a target material by magnetron sputtering said target material comprising a target material layer;

controlling the flow of said sputtered material toward said substrate by placing a grid between said substrate and primary plasma, said grid being electrically grounded, located adjacent to said primary plasma and extending fully over the area of said target material layer;

producing an auxiliary plasma including said sputtered material adjacent to said substrate, said auxiliary plasma being

produced by a d.c. probe having a variable positive bias; and

introducing a reactive gas adjacent to said substrate for reaction with said sputtered material and deposition onto said substrate wherein a thin film is deposited onto said substrate over an area greater than the area of said target material layer.

8. A process according to claim 7 wherein said target material is selected from the group consisting of tin, indium, cadmium, zinc, aluminum, titanium and their alloys.

4,931,159

INSTALLATION FOR CONTINUOUS MANUFACTURING OF AN ULTRATHIN METAL FOIL BY ELECTROLYTIC DEPOSITION

Marios Economopoulos, Liege, and Nicole Lambert, Waremme, both of Belgium, assignors to Centre de Recherches Metallurgiques-Centrum Voor Research in de Metalurgie, Brussels, Belgium

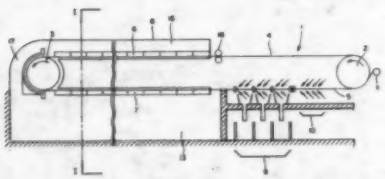
PCT No. PCT/BE88/00004, § 371 Date Dec. 7, 1988, § 102(e) Date Dec. 7, 1988, PCT Pub. No. WO88/06195, PCT Pub. Date Aug. 25, 1988

PCT Filed Feb. 15, 1988, Ser. No. 276,446

Claims priority, application Luxembourg, Feb. 13, 1987, 86.773

Int. Cl.[5] C25D *17/00*

U.S. Cl. 204—208 **12 Claims**



1. An installation for manufacturing an ultrathin foil by electrolytic deposition onto a moving cathode, with subsequent separation of a deposited material from said cathode, said installation including at least one anode having a plate perforated with a first series of orifices connected to means for feeding of electrolyte, said plate being perforated with a second series of orifices supplied with means for evacuating electrolyte, comprising:

(a) a metallic belt of said moving cathode being extended taut between two parallel rolls, at least one of said rolls being motorized so as to cause said belt to rotate around said two rolls;

(b) a first set of said anodes being disposed facing a portion of a length of a first longitudinal run of said belt;

(c) means of electrical connection being provided from said plate of each anode of said first set of anodes to a positive terminal of a source of continuous d.c. current;

(d) means of electrical connection being provided from said metallic belt to a negative terminal of said source of continuous d.c. current; and

(e) means for regulating:

the speed of said metallic belt;

rates of feed and removal of said electrolyte; and

intensity of said electric current.

4,931,160

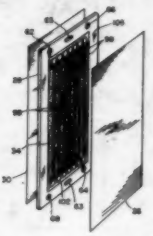
ELECTRODEIONIZATION METHOD AND APPARATUS

Anthony J. Giuffrida, North Andover, Mass., assignor to Millipore Corporation, Bedford, Mass.

Continuation of Ser. No. 48,161, May 11, 1987, abandoned. This application Nov. 23, 1988, Ser. No. 275,314

Int. Cl.[5] B01D *61/46, 61/48, 61/50, 61/58*

U.S. Cl. 204—301 **10 Claims**



1. Electrodeionization apparatus adapted to remove ions from a liquid which comprises:

at least one separation stage comprising,

a cathode compartment at a first end of said stage,

an anode compartment at an end of said stage opposite said first end,

a plurality of alternating ion depletion compartments and ion concentration compartments, said depletion compartments being connected in series, said depletion compartments and concentration compartments being positioned between said cathode compartment and said anode compartment,

each of said ion depletion compartments comprising a spacer and a plurality of subcompartments formed by a plurality of ribs extending along the length of each of said ion depletion compartments,

each of said subcompartments containing a mixture of anion exchange resin and cation exchange resin,

each of said subcompartments having a width defined by the distance between said ribs of between about 0.3 and 4 inches and a thickness between about 0.05 and 0.25 inches and wherein the thickness of said subcompartments is defined by the distance between an anion permeable membrane and a cation permeable membrane being bonded to each of said ribs, along the length of said ribs, and to said spacer,

each of said concentration compartments being free of ion exchange solid composition,

means for passing a first liquid to be purified through at least two of said ion depletion compartments in series in said stage,

means for passing a second liquid for accepting ions from said first liquid through said concentration compartments,

means for applying an electrical voltage between an anode in said anode compartment and a cathode in said compartment and,

means for recovering purified liquid from said depletion compartments.

4,931,161

CLEANUP OF OILY WASTES

Parameshwaran S. Sundar, Fairfax, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Jul. 12, 1989, Ser. No. 379,408

Int. Cl.[5] C10G *17/10*

U.S. Cl. 208—13 **13 Claims**

1. A process for separating hydrocarbons from oily waste, which comprises:

a. adding solids to the oily waste to obtain an oily waste-solids mix,
b. granulating the oily waste-solids mix to obtain granules,
c. contacting the granules with a solvent to obtain a solvent-granules mix, and
d. separating a solvent-hydrocarbon phase and a solids phase from the solvent-granules mix.

4,931,162

PROCESS FOR PRODUCING CLEAN DISTILLATE PITCH AND/OR MESOPHASE PITCH FOR USE IN THE PRODUCTION OF CARBON FILTERS

Hugh E. Romine, Ponca City, Okla., assignor to Conoco Inc., Ponca City, Okla.

Filed Oct. 9, 1987, Ser. No. 106,465
Int. Cl.[5] C10C *1/00, 3/00*
U.S. Cl. 208—41 **6 Claims**

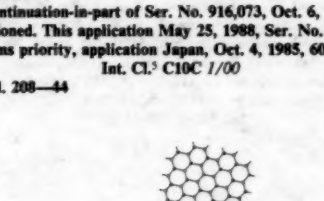
1. A process for preparing a mesophase pitch suitable for the production of high quality carbon fibers which comprises distilling from an aromatics-containing feedstock an aromatic distillate free from mesophase and mesophase-forming resins and having an initial boiling point at atmospheric pressure of above 750° F., heat soaking said distillate without gas sparging at atmospheric pressure and temperatures of from about 660° F. to about 860° F. for a time of from about 2 to about 240 hours to obtain a heat soaked distillate free from mesophase but containing at least 5 percent mesophase-forming resins and having a tetrahydrofuran insolubles content less than 20 percent, then subjecting the heat soaked distillate to further heating at a temperature of from about 700° F. to about 800° F. for a time of about 6 to about 46 hours and atmospheric pressure with inert gas sparging to convert said resins to mesophase pitch.

4,931,163

PITCH FLUORIDE

Nobuatsu Watanabe, Nagaokakyo; Hidekazu Tohara, Nagano; Yuji Matsumura, Nishinomiya, and Hiroyuki Fujimoto, Osaka, all of Japan, assignors to Osaka Gas Co, Ltd., Osaka, Japan

Continuation-in-part of Ser. No. 916,073, Oct. 6, 1986, abandoned. This application May 25, 1988, Ser. No. 198,533
Claims priority, application Japan, Oct. 4, 1985, 60-221440
Int. Cl.[5] C10C *1/00*
U.S. Cl. 208—44 **9 Claims**



1. A pitch fluoride or mesocarbon microbeads fluoride comprising carbon atoms and fluorine atoms and having a structure in which layers containing fluorinated condensed cyclohexane rings are stacked to form a packing structure, the atomic ratio of fluorine to carbon atoms being 0.5 to 1.8, the pitch fluoride or meso carbon microbeads fluoride exhibiting:
(a) in the powder X-ray diffraction pattern, a peak having a maximum intensity at about 13° (2θ), a peak at about 40° (2θ) having an intensity lower than that of the peak appearing at about 13° (2θ) and no peak on the low side of diffraction angle relative to 13° (2θ);
(b) in the spectrum of electron spectroscopy for chemical analysis, a peak due to a monofluorocarbon group at about 290.0±1.0 eV and a peak due to a difluorocarbon group at about 292.5±0.9 eV, the intensity ratio of the peak due to the difluorocarbon group to the peak due to the monofluorocarbon group being 0.15 to 1.5;
(c) a property that it is capable of forming a film by vacuum deposition; and
(d) a contact angle of 141°±8° against water as measured at a temperature of 30° C.

4,931,164

ANTIFOULANT ADDITIVE FOR LIGHT END HYDROCARBONS

Ghazi B. Dickakian, Kingwood, Tex., assignor to Exxon Chemical Patents Inc., Linden, N.J.

Filed Nov. 14, 1988, Ser. No. 270,545
Int. Cl.[5] C10G *9/16*
U.S. Cl. 208—48 AA **16 Claims**

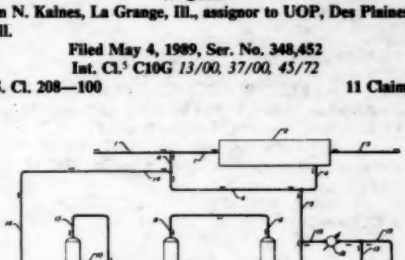
1. A method of treating a highly paraffinic hydrocarbon liquid containing not more than 5 wt% aromatics and from 10 to 10,000 ppm high molecular weight asphaltenes to prevent asphaltene fouling of equipment at temperatures below 400° F., said method comprising adding to the hydrocarbon liquid not less than 10 ppm and not more than 200 ppm of an oil soluble overbased magnesium alkyl aromatic sulfonate to inhibit asphaltene fouling.

4,931,165

PROCESS FOR REFRACTORY COMPOUND REJECTION FROM A HYDROCRACKER RECYCLE LIQUID

Tom N. Kalnes, La Grange, Ill., assignor to UOP, Des Plaines, Ill.

Filed May 4, 1989, Ser. No. 348,452
Int. Cl.[5] C10G *13/00, 37/00, 45/72*
U.S. Cl. 208—100 **11 Claims**



1. A catalytic hydrocracking process which comprises:
(a) contacting a hydrocarbonaceous feedstock having a propensity to form heavy polynuclear aromatic compounds and a liquid recycle stream in a hydrocracking zone with added hydrogen and a metal promoted hydrocracking catalyst at elevated temperature and pressure sufficient to convert a substantial portion of the hydrocabonaceous components in said feedstock to lower boiling products;
(b) recovering a hydrocarbon effluent from said hydrocracking zone and partially condensing the hydrocarbon effluent from said hydrocracking zone and separating the same into a lower boiling hydrocarbon product stream and an unconverted hydrocarbon stream having at least a portion boiling above about 400° F. and comprising trace quantities of heavy polynuclear aromataic compounds;
(c) introducing at least a portion of said unconverted hydrocarbon stream having at least a portion boiling above about 400° F. and comprising trace quantities of heavy polynuclear aromatic compounds into a hydrogen strip-

ping flash zone with a first hydrogen-rich gaseous stream having a temperature greater than said hydrocarbon stream at flash conditions thereby increasing the temperature of said hydrocarbon stream and vaporizing at least a portion thereof to produce a vapor stream comprising hydrogen and hydrocarbon compounds and produce a liquid hydrocarbon stream comprising heavy polynuclear aromatic compounds;

(d) contacting said vapor stream comprising hydrogen and hydrocarbon compounds with a hydrogenation catalyst in a hydrogenation reaction zone at hydrogenation conditions to increase the hydrogen content of the hydrocarbon compounds contained in said vapor stream;

(e) condensing at least a portion of the resulting effluent from said hydrogenation reaction zone to produce a second hydrogen-rich gaseous stream and a liquid stream comprising hydrogenated hydrocarbon compounds;

(f) recycling at least a portion of said liquid stream comprising hydrogenated hydrocarbon compounds recovered in step (e) to said hydrocracking zone in step (a) as at least a portion of said liquid recycle stream; and

(g) recycling at least a portion of said second hydrogen-rich gaseous stream to said first hydrogen-rich gaseous stream in step (c).

4,931,166

ELECTROCHEMICAL CELL

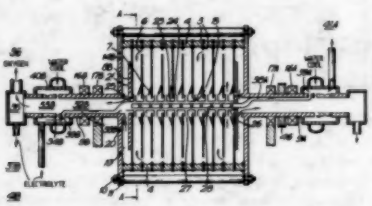
Colin Ramshaw, Norley, United Kingdom, assignor to Imperial Chemical Industries PLC, London, England

Filed Mar. 13, 1989, Ser. No. 322,716

Claims priority, application United Kingdom, Mar. 14, 1988, 8805991

Int. Cl.[5] C25D *17/00, 21/00*; C25C *7/00*

U.S. Cl. 204—212 **4 Claims**



1. An electrode assembly for an electrochemical cell effecting electrochemical reaction between two liquid phases comprising

an electrode, impermeable to the two phases, means for containing the first phase in contact with the electrode,

means for charging the second phase to the electrode, and

means for removing a reaction product of the two phases from the electrode,

which apparatus is characterised by

means for rotating the assembly about an axis, such that when the second phase is charged to the electrically charged, rotating electrode in contact with the first phase, the second phase moves across the electrode from the point of charging and the reaction product is removed from the electrode.

4,931,167

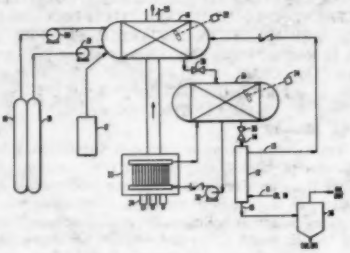
DEGRADATION OF POLYCHLORINATED BIPHENYLS

Carl M. Wilwerding, Klamath Falls, Oreg., assignor to Advanced Refinery Technology, Klamath Falls, Oreg.

Continuation of Ser. No. 108,190, Oct. 13, 1987, abandoned. This application Apr. 21, 1989, Ser. No. 341,316

Int. Cl.[5] C10G *17/00*; C07C *1/30*

U.S. Cl. 208—262.5 **31 Claims**



1. A process for degrading polychlorinated biphenyls in a nonaqueous liquid medium, said process comprising contacting said medium under anhydrous conditions with a metal halide Lewis acid in the presence of a metal hydroxide in alcohol solution, the metal of which metal hydroxide combines with chlorine to form a solid precipitate in said nonaqueous medium at an elevated temperature, to precipitate at least a substantial portion of the chlorine in said polychlorinated biphenyls as the chloride salt of said cation.

4,931,168

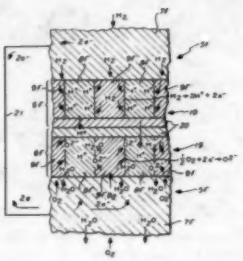
GAS PERMEABLE ELECTRODE

Masahiro Watanabe, No. 2-10, Kitashin 1-chome, Kofu-shi, Yamanashi; Satoshi Motoo, No. 5-24, Takeda 3-chome, Kofu-shi, Yamanashi, and Nagakazu Furuya, No. 4-3-31, Ohte 2-chome, Kofu-shi, Yamanashi, all of Japan, assignors to Masahiro Watanabe, Japan; Satoshi Motoo, Japan; Nagakazu Furuya, Japan and Tanaka Kikinzoku Kogyo, Japan

Continuation of Ser. No. 22,437, Mar. 6, 1987, abandoned. This application May 23, 1989, Ser. No. 356,612

Int. Cl.[5] C25B *11/03*

U.S. Cl. 204—284 **11 Claims**



2. A gas permeable electrode which comprises a gas permeable layer comprising hydrophobic resins and hydrophobic carbon blacks and a reaction layer comprising a semi-hydrophobic porous body prepared by the coagulation of hydrophobic resins, hydrophobic carbon blacks and hydrophilic carbon blacks supporting catalysts therein, both layers being attached to each other producing a finished electrode, the electrolyte impregnating the hydrophilic carbon blacks of the reaction

layer to be held therein, and the hydrophobic carbon blacks thereof constituting gas passages, the finished electrode being substantially free from surfactant.

4,931,169

APPARATUS FOR COATING A SUBSTRATE WITH DIELECTRICS

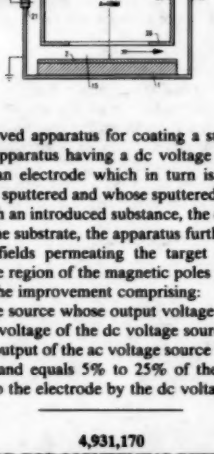
Michael Scherer, Rodenbach; Rudolf Latz, Frankfurt, and Ulrich Patz, Linsengericht, all of Fed. Rep. of Germany, assignors to Leybold Aktiengesellschaft, Fed. Rep. of Germany

Filed Sep. 28, 1988, Ser. No. 250,381

Claims priority, application Fed. Rep. of Germany, Jun. 22, 1988, 38212072

Int. Cl.[5] C23C *14/34*

U.S. Cl. 204—298.11 17 Claims



1. An improved apparatus for coating a substrate with dielectrics, the apparatus having a dc voltage source which is connected to an electrode which in turn is connected to a target which is sputtered and whose sputtered particles form a compound with an introduced substance, the compound being deposited on the substrate, the apparatus further having toroidal magnetic fields permeating the target with field lines emerging in the region of the magnetic poles from the surface of the target, the improvement comprising:

an ac voltage source whose output voltage is superimposed on the dc voltage of the dc voltage source; and

the voltage output of the ac voltage source is coupled to the electrode and equals 5% to 25% of the voltage output supplied to the electrode by the dc voltage source.

4,931,170

METHOD FOR LIGHTENING PETROLEUM HYDROCARBON OIL BY DISTILLATION

Tadashi Sasaki, Tokyo, Japan, assignor to Seibu Oil Co., Ltd., Tokyo and Unique Chemical Consultant, Ltd., Osaka, both of, Japan

PCT No. PCT/JP87/00925, § 371 Date Jun. 22, 1988, § 102(e) Date Jun. 22, 1988, PCT Pub. No. WO88/03942, PCT Pub. Date Jun. 2, 1988

PCT Filed Nov. 28, 1987, Ser. No. 233,659

Claims priority, application Japan, Nov. 29, 1986, 61-283165

Int. Cl.[5] C10G *9/16*; C07C *7/18*

U.S. Cl. 208—348 3 Claims

1. A method of lightening a petroleum hydrocarbon oil by distillation comprising adding 1 part by weight or less of at least one compound selected from the group consisting of pentaerythritol tetrakis-3-mercaptoproprionate, trimethylolpropane tris-3-mercaptopropionate, pentaerythritol tetrakis-mercaptoacetate, and trimethylolpropane tris-mercaptoacetate, to 100 parts by weight of the petroleum hydrocarbon oil when the petroleum hydrocarbon oil is lightened by a thermal treatment.

4,931,171

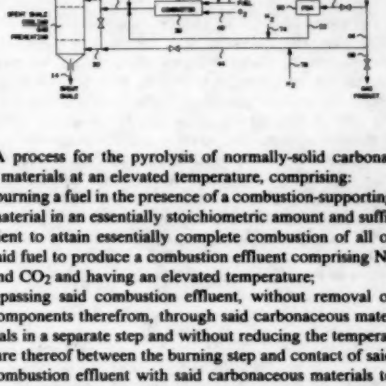
PYROLYSIS OF CARBONACEOUS MATERIALS

Douglas R. Piotter, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Aug. 3, 1982, Ser. No. 404,680

Int. Cl.[5] C10G *1/00*; C10B *53/06*

U.S. Cl. 208—409 31 Claims



1. A process for the pyrolysis of normally-solid carbonaceous materials at an elevated temperature, comprising:

(a) burning a fuel in the presence of a combustion-supporting material in an essentially stoichiometric amount and sufficient to attain essentially complete combustion of all of said fuel to produce a combustion effluent comprising N_2 and CO_2 and having an elevated temperature;

(b) passing said combustion effluent, without removal of components therefrom, through said carbonaceous materials in a separate step and without reducing the temperature thereof between the burning step and contact of said combustion effluent with said carbonaceous materials to thereby produce an elevated temperature within said carbonaceous materials;

(c) pyrolyzing said carbonaceous materials in the presence of said combustion effluent, at the thus produced elevated temperature and in the absence of an oxidizing agent to thus prevent burning of components during said pyrolysis;

(d) withdrawing a gasiform effluent from said pyrolysis step;

(e) separating said gasiform effluent into a normally liquid phase and a normally gaseous pyrolysis off-gas;

(f) recycling at least part of said pyrolysis off-gas to said pyrolysis step; and

(g) passing the thus recycled pyrolysis off-gas countercurrent to said carbonaceous materials in said pyrolysis step.

4,931,172

FLUORIDE ION-SELECTIVE ELECTRODES BASED UPON SUPERIONIC CONDUCTING TERNARY COMPOUNDS AND METHODS OF MAKING

Robert K. Kobos, and Lorenzo F. Pelosi, both of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jun. 2, 1988, Ser. No. 201,233

Int. Cl.[5] G01N *27/30*

U.S. Cl. 204—418 10 Claims

1. A membrane having an active component for use in fluoride ion-selective electrodes, the active component comprising a ternary compound of the type, $M_xLn_yF_{3-x}$ where M is an alkaline earth metal ion and Ln is a lanthanide metal ion, and y equals $1-x$;

where the alkaline earth metal is selected from the group consisting of calcium, strontium and barium,

where the lanthanide metal is selected from the group consisting of lanthanum, cerium, prosiodymium, neodymium, promethium, samarium and europium, and

where the membrane is a hydrophobic polymer matrix and

the ternary compound is in the form of particles disposed throughout the matrix.

4. In a fluoride ion-selective electrode for determining the concentration of fluoride ions in a solution to be measured, the electrode having a tube adapted to contain an internal reference solution containing fluoride ions, an internal reference electrode positioned in the tube and adopted to be contacted by the solution, and a diffusion membrane at one end of the tube adopted to function as a diffusion barrier between the solution to be measured and the reference solution, the improvement wherein the membrane comprises a ternary compound of the type, $M_xLn_yF_{3-x}$ M is an alkaline earth metal ion and Ln is a lanthanide metal ion, as the active component, and y equals $1-x$;

the membrane being a hydrophobic polymer matrix and the ternary compound being in the form of particles disposed throughout the matrix.

6. A method for making a fluoride ion-selective electrode for determining the concentration of fluoride ions in a solution to be measured, the electrode having a tube adapted to contain an internal reference solution containing fluoride ions, an internal reference electrode positioned in the tube and adapted to be contacted by the solution, and a diffusion membrane at one end of the tube adapted to function as a diffusion barrier between the solution to be measured and the reference solution, the improvement wherein the membrane is prepared by the steps of: forming a ternary compound of the type, $M_xLn_yF_{3-x}$ where M is an alkaline earth metal ion and Ln is a lanthanide metal ion, grinding the ternary compound into particles, and incorporating the particles into a hydrophobic polymer to form a matrix of particles and y equals $1-x$.

4,931,173

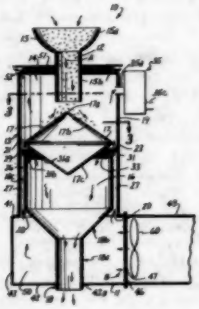
APPARATUS AND METHOD FOR REMOVING DEBRIS FROM GRANULAR MATERIAL

Thomas Lesher, 1615 Avenue E, Kearney, Nebr. 68847

Filed Jun. 10, 1988, Ser. No. 205,225

Int. Cl.[5] B07B 4/02

U.S. Cl. 209—138 **14 Claims**



1. An apparatus for removing debris from granular material comprising:

first duct means for permitting the passage of a continuous flow of the granular material in a given path, said first duct means having a wall defining the outer periphery of said path;

means for directing the flow of the granular material into the first duct means;

means for guiding the flow of material toward the outer periphery of the first duct means;

said means for guiding including a spreader member terminating at its outer edge in a closely spaced apart relationship relative to said wall to help define an opening;

second duct means for permitting the passage of the continuous flow of the granular material in said given path;

means for guiding a continuous uninterrupted flow of air under pressure along a chamber disposed between and adjacent to both the outer periphery of said path and the second duct means and through the flow of granular material into the first duct means to remove debris contained therein;

means for permitting the reverse flow of the granular material away from the wall defining the outer periphery of the path and toward the central axis of said second duct means and for substantially preventing the granular material from entering said chamber;

said means for permitting the reverse flow, including a porous member disposed downstream of said spreader member near said opening for receiving the granular material flowing through said opening, said porous member being inclined from said wall toward said central axis, said air under pressure flowing through said porous member and then through said opening to flow in a direction opposite to the flow of material along said given path;

a rigid member disposed in a spaced apart manner relative to said porous member upstream thereof for defining with said porous member an angularly inclined channel to guide the flow of granular material toward the central axis of said second duct means along a portion of said path;

means for directing the flow of the granular material out of the second duct means; and

means for directing the flow of air and airborne debris contained therein out of said first duct means.

4,931,174

ZIGZAG CLASSIFIER

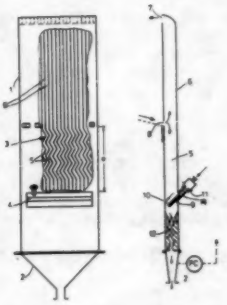
Hans Uhlemann, Solingen; Heiko Herold, Neuss; Reinhard Boeck, Kaarst, and Hans Daun, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Feb. 27, 1989, Ser. No. 316,368

Claims priority, application Fed. Rep. of Germany, Mar. 11, 1988, 3808116

Int. Cl.[5] B03B 4/02

U.S. Cl. 209—139.1 **6 Claims**



1. An apparatus for classifying particulate material, comprising:

(a) a plurality of vertically disposed zig-zag shaped channels, each having a uniform cross-section along the entire length thereof;

(b) means forming a common collecting classifier space connected to all of the zig-zag channels at a bottom end thereof;

(c) a plurality of air inlet means, each disposed above the common collecting classifier space at a lower end of the zig-zag channels for providing air to each individual channel; and

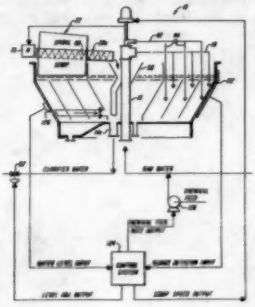
(d) common air supply means connecting the channels in parallel and including a duct in communication with all of the air inlet means for providing each of the channels with the same air flow.

4,931,175

WATER CLARIFYING APPARATUS

Milos Krofta, Lenox, Mass., assignor to Lenox Institute for Research, Inc., Lenox, Mass.

Filed Sep. 7, 1988, Ser. No. 241,384
Int. Cl.[5] C02F *1/24*
U.S. Cl. 210—86 **14 Claims**



1. In apparatus for clarifying raw water containing particulate contaminants where the apparatus includes (i) a cylindrical flotation tank, (ii) an inlet means to the flotation tank for raw water (iii) an inlet means for aerated water that also feeds the flotation tank, (iv) means for controlling the water level within the tank, (v) means for removing floated sludge from the surface of the water held in the tank which is formed by a flow of rising of air bubbles released from the aerated water in the tank which coalesce with particulate contaminants from the raw water and with a flocculation agent introduced into the flotation tank, and (vi) clarified water outlet means for directing the clarified water with contaminants thus removed from the flotation tank, wherein the improvement comprises,

a set of conical, mutually spaced apart plates located in said flotation tank, said plates extending circumferentially over at least a majority of the tank, substantially the full circumferential distance about said tank except for a sector wherein said clarified water outlet means and floating sludge removal means are located, and each plate being generally flat in cross section and concentric with said tank with a generally flat surface to minimize turbulence in the water due to the rotation, and

means for rotating said set of conical plates in unison with said sludge removal means and said clarified water outlet means within said flotation tank with said plates about the center of said tank so that said plates are oriented along their direction of rotation.

4,931,176

INSTALLATION FOR THE SEPARATION OF THE CONSTITUENTS OF A SUSPENSION

Paul Guinard, Saint Cloud, France, assignor to Guinard Oil Services, France

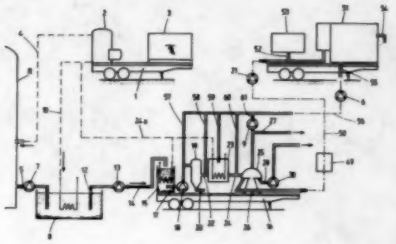
Division of Ser. No. 38,728, Apr. 15, 1987, Pat. No. 4,810,393. This application Nov. 17, 1988, Ser. No. 272,446
Claims priority, application France, Apr. 22, 1986, 86 05780
Int. Cl.[5] B01D *36/02*
U.S. Cl. 210—179 **10 Claims**

1. Apparatus for the separation of the constituents of a suspension containing water, oil and solid materials, particularly oil sludges, which comprises:

a self-cleaning filter, constituted by an envelope having an inlet for the suspension and an outlet for sediments, a filtering surface defining with the inner wall of the envelope a chamber for the filtrate equipped with an outlet for the same, and means for unclogging the filtering surface;

a heater;

a centrifugal separator for separating the suspension into an essentially aqueous phase, an essentially oily phase and



into sediments mainly comprising solid materials, water and traces of oil, said heater being located between the self-cleaning filter and said centrifugal separator; and

a filter connected to an outlet for the sediments from the centrifugal separator, said filter having a mesh size between 0.4 and 0.5 mm and functioning with the application of pressure to the product to be filtered.

4,931,177

COMPOSITE PLATE FOR FILTER-PRESSES

Alfred H. Parmentier, 69, Bd Machtens B6, B-1080 Brussels, Belgium

Continuation-in-part of Ser. No. 14,043, Jan. 6, 1987, abandoned. This application Dec. 16, 1988, Ser. No. 285,271
Claims priority, application France, Jun. 4, 1985, 85 08529; Jul. 24, 1985, 85 11424
Int. Cl.[5] B01D *25/12*
U.S. Cl. 210—228 **10 Claims**

1. A composite plate for a filter press, comprising, in sequence:

a first thin rigid frame for collecting filtrates and receiving a filter cake;

a first grooved, elastic membrane;

a second thin rigid frame attached to said first membrane;

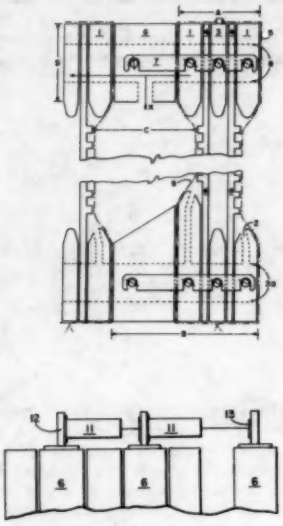
a second grooved, elastic membrane, said first and second membranes and said second frame defining a fluid chamber for receiving compressed fluid to inflate said membranes;

a third thin rigid frame;

filter means on said first and third frames;

coupling means for releasably attaching said frames, said membranes and said filter means;

a rigid extension extending from a top of the composite plate; and



a jack engaging said extension for selectively separating adjacent composite plates for removal of a filter cake therebetween.

4,931,178

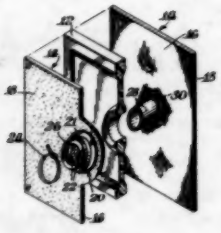
FILTER CLOTH ASSEMBLY

James L. Manniso, Newark; John H. Lutz, Claymont, and Craig R. Rinschler, Hockessin, all of Del., assignors to W. L. Gore & Associates, Inc., Newark, Del.

Filed Apr. 16, 1985, Ser. No. 723,848

Int. Cl.[5] B01D *25/12*

U.S. Cl. 210—228 **16 Claims**



1. A filter cloth assembly for use on a center-feed filter plate of a filter press comprising a first and a second section of filter cloth disposed on opposite sides of said plate, said cloths including concentric holes adapted to align with a corresponding hole in said plate; said first cloth including a tubular stem member having a flanged base, said base being secured to said cloth and extending from said cloth in concentric alignment with said hole in said cloth and adapted for extending through said hole in said plate and mating with a corresponding member on a second filter cloth disposed on the opposite side of said plate; said second cloth including a flanged coupling member having a flanged base secured to said second cloth in concentric alignment with said hole in said second cloth, the coupling member of said second cloth adapted to fit closely and concentrically over the tubular stem of the first cloth extending from the hole in the plate when the cloths are assembled in place on opposite sides of the filter plate; and means for effecting a non-leaking liquid seal between the stem and the coupling member of said first and second cloths as assembled together on the filter plate.

4,931,179

FILTER SECTION FOR A ROTATABLE FILTER

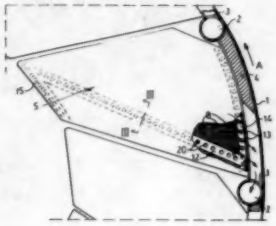
Bjarne Nilsson, Lanternatan 9, S-462 00 Vänersborg, Sweden

Filed Jun. 23, 1988, Ser. No. 210,442

Claims priority, application Sweden, Jun. 24, 1987, 8702617

Int. Cl.[5] B01D *33/26*

U.S. Cl. 210—331 **7 Claims**



1. A filter section for a rotatable filter of the kind including a plurality of such filter sections assembled into an annular filter disk for filtering a liquid, said filter section having a radially inner peripheral edge and a radially outer peripheral edge and including two mutually spaced plate-shaped elements having outer and inner surfaces, said outer surfaces being provided with a plurality of uniformly spaced protrusions keeping a filtering medium spaced from said outer surfaces, said plurality of protrusions are spaced in a radial direction of said filter section so as to allow liquid flow therebetween in directions other than said radial direction; said inner surfaces defining a compartment within said filter section communicating with an outlet of said filter section, wherein

(a) said compartment is completely filled with a hardened compound adhering to said inner surfaces of said plate-shaped elements;

(b) means defining at least one substantially radial drainage channel extend from said radially inner peripheral edge to said radially outer peripheral edge through said compound between said inner surfaces of said plate-shaped elements, said drainage channel communicating with said outlet of said filter section; and

(c) means defining openings are provided in said plate-shaped elements to establish fluid communication between said outer surfaces and said drainage channel.

4,931,180

SELF CLEANING FILTERING APPARATUS

Alain Darchambeau, Orleans, France, assignor to Combustion Engineering Europe, France

Filed Nov. 14, 1988, Ser. No. 270,799

Claims priority, application France, Nov. 25, 1987, 87 16332

Int. Cl.[5] B01D *29/64*

U.S. Cl. 210—414 **7 Claims**

1. A self-cleaning apparatus for filtering a liquid comprising:

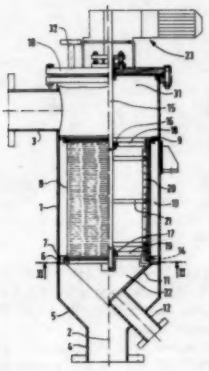
a body having a liquid inlet duct at one end thereof and a filtrate outlet duct at another end thereof;

a filtering basket disposed within said body and communicating with said inlet duct to receive therein a liquid to be filtered;

at least one rotatable scraper provided within said basket for cleaning said basket;

a drain for discharging waste from the interior of said basket, said basket being connected to said drain through a frusto-conical hopper having at least one stirring vane mounted therein;

said basket forming, with said body, a peripheral annular space having a radial width and communicating with said



outlet duct through an annular opening having a radial width smaller than the radial width of said peripheral annular space, said annular opening being located between said body and said basket, said annular opening forming an annular restriction for reducing the flow and increasing the velocity of liquid passing therethrough towards said outlet duct;

said body further including a frusto-conical skirt located between said annular opening and said outlet duct.

4,931,181

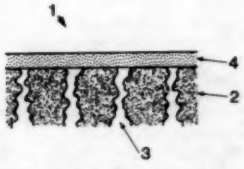
COMPOSITE MEMBRANES FOR FLUID SEPARATIONS

Ingo Blume, Hengelo, Netherlands; Klaus-Viktor Peinemann, Reinbek, Fed. Rep. of Germany; Ingo Pinnau, Austin, Tex., and Johannes G. Wijmans, Menlo Park, Calif., assignors to Membrane Technology & Research, Inc., Menlo Park, Calif.

Filed Jun. 2, 1989, Ser. No. 361,024

Int. Cl.[5] B01D *13/00, 13/04*

U.S. Cl. 210—500.27 **7 Claims**



1. A process for separating a first component, A, from a second component B, of a fluid mixture, comprising:

providing a membrane having a feed side and a permeate side, said membrane comprising a composite of a microporous support layer having a thickness l_1 coated with a permselective layer, the permselective layer characterized in that it has an intrinsic selectivity α for a first component, A, over a second component, B, in a fluid mixture of at least 10, and a thickness l_2 given by:

$$l_2 = l_1 \frac{(K\alpha/P_{1(A)} - 1/P_{1(B)})}{(1/P_{2(B)} - K\alpha/P_{2(A)})}$$

where

$P_{1(A)}$ and $P_{1(B)}$ are the permeabilities of the support layer to components A and B respectively, and where K is a constant having a value between 0.7 and 1;

contacting said feed side with a fluid mixture comprising components A and B; withdrawing from said permeate side a permeate stream enriched in component A compared with said fluid mixture;

withdrawing from said feed side a residue stream depleted in component A compared with said fluid mixture.

4,931,182

MEMBRANES FORMED FROM UNSATURATED POLYIMIDES

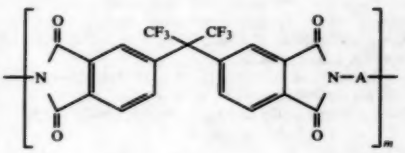
William F. Burgoyne, Jr., Emmaus; Michael Langsam, Allentown; Michael E. Ford, Coopersburg, and Jeremiah P. Casey, Emmaus, all of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

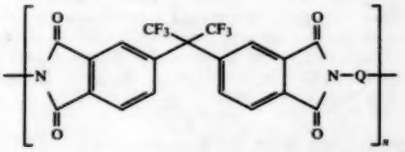
Filed Nov. 8, 1989, Ser. No. 433,495

Int. Cl.[5] B01D *13/00*

U.S. Cl. 210—500.39 **15 Claims**

1. A semi-permeable membrane formed of a polyimide containing copolymerizable, surface modifiable units of the formula:





where N—A—N is an aromatic diamine;

Q is an alkenylated phenylene or diphenylene containing a vinyl or vinylaryl group; and

m an n are integers such that the ratio of m:n is from 0.1 to 99.

4,931,183

PROCESS AND APPARATUS FOR THE BIOLOGICAL PURIFICATION OF WATER

Hans-Ulrich Klein, Verdistrasse 2, 6200 Wiesbaden, and Klaus Kratzenstein, Köttchen 9, 5830 Schwelm, both of Fed. Rep. of Germany

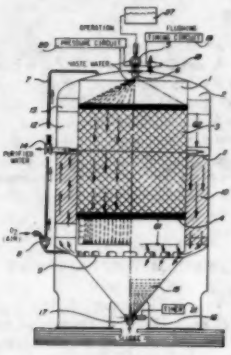
Filed Jun. 24, 1988, Ser. No. 210,815

Int. Cl.[5] C02F *3/04*

U.S. Cl. 210—614 **20 Claims**

1. Apparatus for the biological purification of water comprising: a first chamber containing a percolating filter means therein, through which the water to be treated passes downwardly; a second chamber containing a filter means comprising a filter material having a specific gravity of <1 and an upper nozzle plate at the top thereof, wherein the water to be treated flows through said filter material upwardly; means providing fluid communication between the bottoms of the first and second chambers; a waste water feed conduit opening into the

first chamber at the top thereof; an oxygen-containing gas feed conduit opening into the first chamber; and a clean water



removal conduit in fluid communication with the second chamber above said nozzle plate.

4,931,184

OPTICAL RESOLUTION WITH TRIBENZOYL-B-1,4-CHITOSAN

Yoshio Okamoto, Amagasaki; Koichi Hatada, Ikeda; Tohru Shibata, Himeji; Hajime Namikoshi, Himeji, and Ichiro Okamoto, Himeji, all of Japan, assignors to Daicel Chemical Industries, Ltd., Osaka, Japan

Continuation of Ser. No. 716,712, Mar. 27, 1985, abandoned. This application Oct. 28, 1988, Ser. No. 266,225

Claims priority, application Japan, Apr. 5, 1984, 59-68087

Int. Cl.[5] B01D *15/08*

U.S. Cl. 210—635 **2 Claims**

1. A method for chromatographically separating optical isomers from a mixture thereof, which comprises the step of contacting said mixture, under conditions effective for chromatographic separation, with tribenzoyl-β-1,4-chitosan having an esterification ration of 85 percent or more as the chromatographic separation agent.

4,931,185

METHOD AND APPARATUS INTENDED FOR THE FILTRATION ON A MEMBRANE OF A PRODUCT SUCH AS MILK

Claude Bourgeois, and Jean-Yves Colin, both of Quimper, France, assignors to A.D.R.I.A., Quimper, France

PCT No. PCT/FR86/00198, § 371 Date Mar. 31, 1987, § 102(e) Date Mar. 31, 1987, PCT Pub. No. WO86/07279, PCT Pub. Date Dec. 18, 1986

PCT Filed Jun. 9, 1986, Ser. No. 26,759

Claims priority, application France, Jun. 11, 1985, 85 089992

Int. Cl.[5] B01D *13/00*

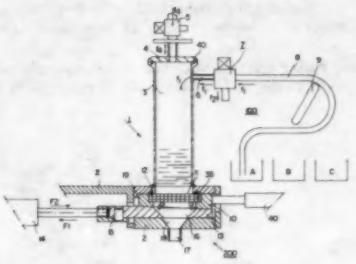
U.S. Cl. 210—636 **6 Claims**

1. A method for effecting the filtration of a product, on a filter or a filtering membrane (11), for recovering micro-organisms on said filter (11) for analysis of said recovered micro-organisms, characterized in that it includes the following essential cycles performed by means of the same apparatus, namely:

Cycle A: Filling of a reservoir (3) and pressurization thereof, so that the liquid introduced into the reservoir (3) transmits under pressure through the filter (11) before being discharged.

Cycle B: Rinsing of the filter (11) by introduction of a rinsing product into the reservoir, the filter (11) being still in position.

Cycle C: Recovering of the filter (11) and positioning of a substitution filter.



Cycle D: Rinsing of the reservoir (3) by introducing a disinfectant agent therein.

4,931,186

CONCENTRATION OF SOLIDS IN A SUSPENSION

Douglas L. Ford; Eric W. Anderson, and Clinton V. Kopp, all of New South Wales, Australia, assignors to Memtec Limited, Parramatta, Australia

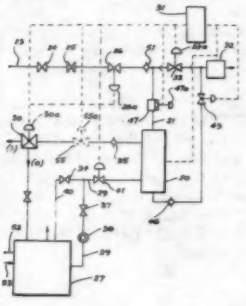
PCT No. PCT/AU86/00049, § 371 Date Oct. 27, 1986, § 102(e) Date Oct. 27, 1986, PCT Pub. No. WO86/05116, PCT Pub. Date Sep. 12, 1986

PCT Filed Mar. 3, 1986, Ser. No. 939,121

Claims priority, application Australia, Mar. 5, 1985, PG9572; Mar. 13, 1985, PG9692; Nov. 11, 1985, PG3355

Int. Cl.[5] B01D *13/00*

U.S. Cl. 210—636 **11 Claims**



1. A method of concentrating solids in a liquid suspension using a microfilter, said liquid suspension containing either a high solids content or solids which substantially form a gel-limiting layer on a filter surface or in pores of said filter, said microfilter comprising a plurality of hollow microporous, elastic fibres within a shell or housing, each fibre having an outer surface, an inner surface defining a lumen, and a porous wall therebetween, said method comprising the steps of:

(i) applying the liquid suspension to the outer surface of the elastic microporous, hollow fibres; whereby:

(a) a portion of the liquid suspension passes through the walls of the fibres, thereby being drawn off as clarified liquid from the fibre lumens,

(b) at least a portion of the solids of said suspension is retained on or in the fibres or otherwise within the shell while the remaining solids not being retained are removed from the shell with the remaining portion of the liquid suspension;

(ii) discharging the retained solids from the shell by:

(a) applying to the fibre lumens a gas at a pressure sufficient to stretch substantially all of the pores, followed by:

(b) maintaining the flow of the gas at said pressure through the lumens for a time sufficient to drive the liquid from the pores having a bubble point below the pressure of the gas so as to wash out any solids retained in those pores and to substantially dislodge solids retained on the outer surface of the fibres whereby the washed and dislodged solids are removed from the shell to an external collection point, and then

(c) reducing the pressure of the gas so that the pores will substantially return to their original size whereupon the gas is removed so that a portion of the liquid suspension passes through the walls of the fibres to be drawn off as a clarifying liquid from the fibre lumens.

4,931,187

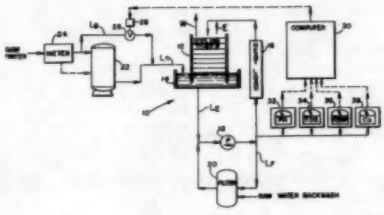
COOLING TOWER SYSTEM

James J. Derham, Ft. Washington; Joseph M. Hannigan, North Wales, and Joseph Derham, Ft. Washington, all of Pa., assignors to Klenzoid, Inc., Conshohocken, Pa.

Filed Feb. 7, 1989, Ser. No. 306,950

Int. Cl.[5] B01D *15/04*; C02F *1/58*

U.S. Cl. 210—662 **12 Claims**



1. A system for controlling an aqueous coolant circulated through a cooling tower without requirement of bleed-off, comprising:

means for monitoring selective characteristics of the aqueous coolant including the pH, temperature, total dissolved solids, calcium content and alkalinity thereof;

computer means coupled to said monitoring means for determining a resultant value indicative of calcium content necessary in the aqueous coolant to maintain a Langelier Saturation Index therefor at a zero level based upon the monitored characteristics; and

water treatment means coupled to said computer means for controlling the calcium content of the aqueous coolant necessary to maintain the zero level Langelier Saturation Index therefor by adjusting the calcium concentration of raw make-up water supplied to the cooling tower in accordance with said resultant value.

4,931,188

POLYMERS FOR BOILER WATER TREATMENT

Fu Chen, Newtown, Pa., assignor to Betz Laboratories, Inc., Trevose, Pa.

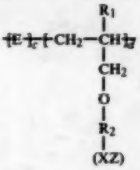
Continuation-in-part of Ser. No. 220,195, Jul. 18, 1988, Pat. No. 4,895,664, which is a continuation-in-part of Ser. No. 37,484, Apr. 13, 1987, Pat. No. 4,759,851, which is a continuation of Ser. No. 864,049, May 16, 1986, Pat. No. 4,659,481, which is a continuation of Ser. No. 545,563, Oct. 26, 1983, abandoned. This application Apr. 14, 1989, Ser. No. 338,016

The portion of the term of this patent subsequent to Mar. 6, 2007, has been disclaimed.

Int. Cl.[5] C02F *5/14*

U.S. Cl. 210—697 **13 Claims**

1. A method of controlling the deposition of scale imparting precipitates on the structural parts of a steam generating system exposed to an aqueous medium containing scale imparting precipitates under deposit forming conditions, said method comprising adding to said aqueous medium an effective amount for the purpose of a water soluble polymer having repeat units of the structure:



wherein E is acrylic acid, methacrylic acid or polymerized mixtures thereof, R_1 is H or lower (C_1–C_3) alkyl, R_2 is 2-hydroxypropylene, XZ is an amino functionality of the formula

wherein F_1 and F_2 are independently selected from H and C_1–C_5 alkyl, the molar ratio of repeat units c:d being from about 15:1 to about 1:10.

4,931,189

METHODS FOR INHIBITION OF SCALE IN HIGH BRINE ENVIRONMENTS

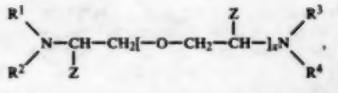
Balram Dhawan; Derek Redmore, and John L. Przybylinski, all of St. Louis, Mo., assignors to Petrolite Corporation, St. Louis, Mo.

Division of Ser. No. 266,449, Nov. 2, 1988, abandoned. This application Jun. 15, 1989, Ser. No. 368,699

Int. Cl.[5] C02F *5/14*

U.S. Cl. 210—700 **2 Claims**

1. A method for inhibiting oil field scale formation including gypsum or borite in a high brine environment comprising introducing an effective amount of a scale inhibiting composition to a high brine environment susceptible to gypsum or borite scale formation, said environment having a total dissolved solids content of at least about 150 g/l, and said scale inhibiting composition comprising an aminomethylene phosphonate of the formula

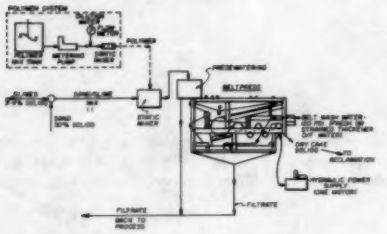


wherein x is 2 or 3, each Z is independently selected from the group consisting of H and CH_3, and R^1, R^2, R^3, and R^4 are independently selected from the group consisting of hydrogen and $—CH_2PO_3M_2$ wherein the M's are independently selected from the group consisting of hydrogen and cations associated with Lewis bases, such that at least about 80% of the R^1, R^2, R^3, and R^4 in the composition is $—CH_2PO_3M_2$.

4,931,190
FLOCCULATING AGENT COMBINATIONS FOR MINERAL SLIME FILTRATION SYSTEMS

Timothy J. Laros, Salt Lake City, Utah, assignor to Envirotech Corporation, Menlo Park, Calif.

Filed Dec. 27, 1988, Ser. No. 290,648
Int. Cl.[5] C02F 1/56
U.S. Cl. 210—710 8 Claims



1. In a method of dewatering phosphate slimes containing about 3% to 8% by weight solids on a belt press filter, the improvement comprising adding to said slime prior to its introduction to said belt press filter a combination of flocculating agents comprising a high molecular weight anionic polyacrylamide and a high molecular weight nonionic polyethylene oxide flocculating agent having a molecular weight of about five million to about eight million, said polyethylene oxide flocculating agent added to be present at a concentration of about 0.001% to about 0.1% by weight and said polyacrylamide added to be present as about 0.02% to about 0.01% by weight based upon the weight of said slime, wherein the weight ratio of polyacrylamide to polyethylene oxide is about 2:1 to about 25:1, and no more than a total of about 1.2 pounds of flocculating agent per ton of slime is added, and passing said slime through a mechanical dewatering apparatus to remove free water.

4,931,191
METHOD FOR SEPARATING SOLIDS FROM WATER USING AMINE CONTAINING POLYMERS

Michael L. Braden, and Stephen J. Allenson, both of Richmond, Tex., assignors to Nalco Chemical Company, Naperville, Ill.

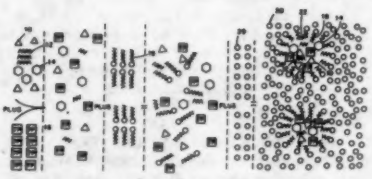
Filed Jan. 13, 1989, Ser. No. 296,638
Int. Cl.[5] C02F 1/56
U.S. Cl. 210—725 11 Claims

1. A method for clarifying water by liquid/solid separation comprising treating the water with an effective clarifying amount of an oil-in-water emulsion containing a polymer produced by the emulsion polymerization of only hydrophobic monomers, where at least one hydrophobic monomer is an amine containing monomer present in the polymer at at least 40 mole percent of total monomer and capable of reacting with acid to form an amine salt thereby becoming hydrophilic, breaking said emulsion and dissolving said polymer in said water at a pH below about 7, and then coagulating/flocculating the solids/oils in the water being treated with said polymer, and separating the solids/oils from the water to form a clarified water.

4,931,192
METHOD FOR THE DISPOSAL OF HAZARDOUS NON-POLAR ORGANIC WASTES

J. Stansill Covington; Michael A. McBride, both of Memphis, Tenn., and Michael E. Hayes, Fernandina Beach, Fla., assignors to The University of Tennessee Research Corporation, Knoxville, Tenn.

Filed Mar. 22, 1989, Ser. No. 327,015
Int. Cl.[5] C02F 11/14; C04B 31/00
U.S. Cl. 210—751 14 Claims



1. In a method for preparing a hazardous non-polar organic material for disposal in a landfill or other disposal area, the improvement comprising the steps of

admixing said non-polar organic material with a solvent therefore and a surfactant to provide a first solution,

emulsifying said first solution with water,

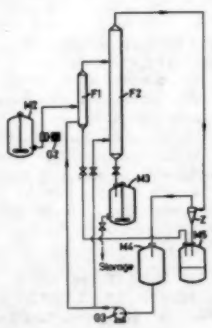
mixing said emulsion with a sufficient quantity of cement to develop a settable mixture, and

thereafter allowing said settable mixture to solidify forming a solidified mass.

4,931,193
TREATMENT OF CATALYST PARTICLES

Pierre Crouzet, Martigues, France, assignor to BP Chemicals Limited, London, United Kingdom

Division of Ser. No. 2,162, Jan. 12, 1987, Pat. No. 4,714,553.
This application Nov. 18, 1988, Ser. No. 274,304
Claims priority, application France, Jan. 12, 1987, 86 00724
Int. Cl.[5] E01D 17/00; 45/02
U.S. Cl. 210—768 6 Claims



6. A process for separating particles of a Ziegler-Natta type catalyst into at least two portions which differ in average particle size which comprises introducing solid Ziegler-Natta type catalyst particles into an elutriation apparatus containing an inert non-polar elutriation liquid in the presence of a polar aprotic compound, obtaining at least two portions of said Ziegler-Natta type catalyst particles which differ in average particle size, the portion having a larger particle size being obtained at one point in the apparatus and obtaining the portion having a smaller particle size at another point in the apparatus, the kinds and concentrations of non-polar elutriation

liquid and polar aprotic compound being sufficient to enable significant separation of the fine particles from the large particles.

4,931,194

ENHANCED OIL RECOVERY WITH HIGH MOLECULAR WEIGHT POLYVINYLAMINE FORMED IN-SITU

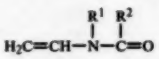
Robert K. Pinschmidt, Jr., 1033 N. Glenwood St., Allentown, Pa. 18104, and Ta-Wang Lai, 401 Ignacio Blvd., Apt. 133, Novato, Calif. 94949

Continuation-in-part of Ser. No. 164,158, Mar. 4, 1988, Pat. No. 4,828,725, which is a continuation-in-part of Ser. No. 914,046, Oct. 1, 1986, abandoned. This application Jan. 9, 1989, Ser. No. 295,183

Int. Cl.[5] E21B *43/22*

U.S. Cl. 252—8.551 **15 Claims**

1. A process for enhancing the recovery of oil or gas from a porous underground formation bearing oil or gas which comprises injecting into said formation an aqueous fluid containing from about 0.1 to 2 weight percent of substantially unhydrolyzed poly(N-vinylamide) having an average molecular weight of at least 10^6, which is homopolymer or copolymer of monomers having the formula:



wherein R^1 and R^2 are each independently H or C_1–C_4 alkyl; and subjecting said poly-(N-vinylamide) within said formation to strongly acidic or strongly basic hydrolyzing conditions, thereby converting said poly(N-vinylamide) in situ to a viscosifying amount of poly(vinylamine) within said aqueous fluid.

9. A process for enhancing the recovery of oil or gas from a porous underground formation bearing oil or gas which comprises mixing together an acidic or alkaline aqueous solution and a water-in-oil emulsion of at least 10^6 average molecular weight poly(N-vinylamide) formed by polymerizing N-vinylamide in an inverse emulsion, thereby forming an injection fluid containing from about 0.1 to 2 weight percent of said poly(N-vinylamide); injecting said fluid into said formation; and subjecting said poly(N-vinylamide) within said formation to strongly acidic or strongly basic hydrolyzing conditions to convert said poly(N-vinylamide) to poly(vinylamine) in sufficient amount to produce a viscosifying effect.

4,931,195

LOW VISCOSITY STABLE NON-AQUEOUS SUSPENSION CONTAINING ORGANOPHILIC CLAY AND LOW DENSITY FILLER

Hoai-Chau Cao, Liege, and Marie-Christine Houben, Alleur, both of Belgium, assignors to Colgate-Palmolive Company, New York, N.Y.

Continuation of Ser. No. 102926, Sep. 30, 1987, abandoned, which is a continuation-in-part of Ser. No. 73551, Jul. 15, 1987, Pat. No. 4,828,723. This application Mar. 17, 1989, Ser. No. 324,996

Int. Cl.[5] D06M *11/00*; C11D *1/66, 1/72, 3/066*

U.S. Cl. 252—8.8 **25 Claims**

1. A non-aqueous liquid fabric treating composition which comprises (a) a non-aqueous liquid comprising a nonionic surfactant; (b) functionally active laundry additive solid particles including at least one of detergent builders and bleaching agents suspended in said non-aqueous liquid; at least one of (c) low density filler having a density in the range of from about 0.01 to 0.5 g/cc in an amount of from about 0.01 to 10% by weight of the composition before the addition of said filler and sufficient to substantially equalize the density of the continuous liquid phase and the density of the suspended particle phase, inclusive of the low density filler and the suspended functionally active solid particles, thereby inhibiting settling of the suspended particles while the composition is at rest, and (d) an amount in the range of 0.1 to 1.0% by weight, based on the total composition, of an organophilic clay, to inhibit phase separation when the composition is subjected to strong vibrational forces; and (e) lecithin or an alkylamine-, alkenylamine-, alkylammonium- or alkenylammonium-phosphate ester of glycol, polyglycol or glycerol, having at least one long chain fatty carboxylic acid ester group in the molecule, in an amount sufficient to reduce the viscosity and further stabilize the rheological properties of the composition.

4,931,196

LUBRICANT COMPOSITION CONTAINING MULTIFUNCTIONAL LUBRICANT ADDITIVES

John D. Payne, and Robert M. O'Neil, both of Manchester, England, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

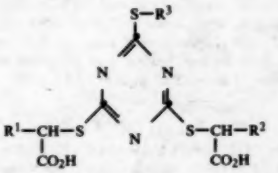
Filed Nov. 25, 1988, Ser. No. 275,816

Claims priority, application United Kingdom, Dec. 8, 1987, 8728675

Int. Cl.[5] C10M *135/00*

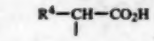
U.S. Cl. 252—47.5 **8 Claims**

1. A lubricant composition comprising a lubricating oil and, as a multifunctional additive, at least one compound of formula (I)



(I)

in which R^1 and R^2 are, independently, hydrogen or C_1–C_{20} alkyl and R_3 is hydrogen, C_1–C_{20} alkyl or a group of formula



wherein R^4 is H or C_1–C_{20} alkyl.

4,931,197

COPOLYMERS FOR α-β-UNSATURATED DICARBOXYLIC ACID ESTERS WHEREIN SAID ESTERS ARE COMPRISED OF ETHOXYLATED ESTERS, METHODS FOR THEIR PRODUCTION AS WELL AS THEIR USE AS LUBRICANT FOR THE WORKING-UP OF PLASTICS

Heinz Beck, Düren; Karl-Heinz Frassek, Langerwehe, both of Fed. Rep. of Germany; Eduard M. Verhulst, Zevenaar, and Egenius A. Giezen, Rheden, both of Netherlands, assignors to AKZO NV, Arnhem, Netherlands

Continuation of Ser. No. 418,401, Sep. 15, 1982, abandoned. This application Mar. 4, 1988, Ser. No. 168,554

Claims priority, application Fed. Rep. of Germany, Sep. 17, 1981, 3136931

Int. Cl.[5] C10M *101/04*; C08F *18/16*

U.S. Cl. 252—56 R **20 Claims**

1. Copolymers of:

a. α-olefin hydrocarbons having 8 to 24 carbon atoms, and

b. α,β-unsaturated dicarboxylic acid esters having an alcohol component, said alcohol component thereof consisting of ethoxylated alcohols having a degree of ethoxylation from 1 to 45 and wherein ethoxylated alcohol esters are the sole ester group present, wherein the mole ratio of α-olefin hydrocarbon to α,β-unsaturated dicarboxylic acid ester in said copolymers is from 0.5 to 4.

4,931,198

MAGNETIC PARTICLES COMPOSED MAINLY OF FEC AND A PROCESS FOR PREPARING SAME

Takuya Arase, Settsu; Katsushi Tokunaga, Suita, and Shigeo Daimon, Osaka, all of Japan, assignors to Daikin Industries Ltd., Osaka, Japan

Continuation of Ser. No. 104,994, Oct. 6, 1987, abandoned. This application Sep. 18, 1989, Ser. No. 408,955
Claims priority, application Japan, Oct. 6, 1986, 237714
Int. Cl.[5] C01B *31/30, 35/56*
U.S. Cl. 252—62.51 4 Claims

1. Magnetic particles for use in a magnetic recording medium composed mainly of FeC having an average particle size of 0.1 to 2 μm and an average axial ratio of 3 to 20.

2. A process for preparing magnetic particles for use in a magnetic recording medium composed mainly of FeC having an average particle size of 0.1 to 2 μm and an average axial ratio of 3 to 20, comprising:

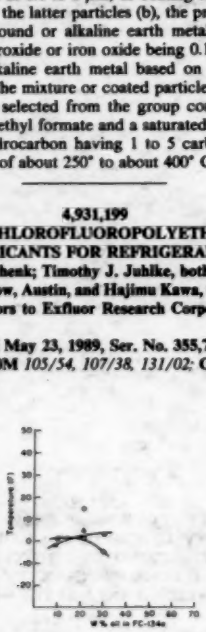
mixing (a) a boron compound or alkaline earth metal compound with (b) iron oxyhydroxide or iron oxide particles having an average axial ratio of 3 to 20, and an average particles size of 0.1 to 2 μm, or coating the former compound (a) to the latter particles (b), the proportion of the boron compound or alkaline earth metal compound to iron oxyhydroxide or iron oxide being 0.1 to 20 atom % boron or alkaline earth metal based on iron, and then carburizing the mixture or coated particles with a carburizing agent selected from the group consisting of CO, methanol, methyl formate and a saturated or unsaturated aliphatic hydrocarbon having 1 to 5 carbon atoms at a temperature of about 250° to about 400° C.

4,931,199

USE OF CHLOROFLUOROPOLYETHERS AS LUBRICANTS FOR REFRIGERANTS

Thomas R. Bierschenk; Timothy J. Juhlke, both of Roundrock; Richard J. Lagow, Austin, and Hajimu Kawa, Georgetown, all of Tex., assignors to Exfluor Research Corporation, Austin, Tex.

Filed May 23, 1989, Ser. No. 355,771
Int. Cl.[5] C10M *105/54, 107/38, 131/02;* C09K *5/02*
U.S. Cl. 252—68 18 Claims



1. A composition, comprising:

(a) hydrofluorocarbon refrigerant; and

(b) an amount of chlorofluoropolyether lubricant sufficient to impart desired lubricity thereto, wherein the chlorofluoropolyether lubricant has a molecular weight of from about 1000 to about 5000 amu, a viscosity of about zero to about 200 centistokes at 40° C., a viscosity index of at least 20 and miscible in the refrigerant at from about −18° C. to about 100° C.; wherein the chlorofluoropolyether has an average formula:

$$FC-[(O-CF_2-\underset{\displaystyle R}{\underset{|}{CF}})_n-OX]_3$$

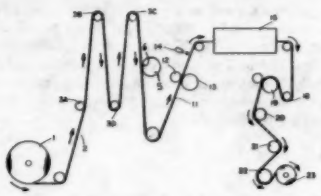
wherein X is selected from the group consisting of $-CF_3$, $-C_2F_5$ and $-CF_2OCF_3$; wherein n is an integer from 1 to 50; wherein R is selected from the group consisting of $-F$, $-CF_2Cl$, $-CFCl_2$, CCL_3 and perfluoroalkyl of one to ten carbons; and wherein the chlorofluoropolyether has at least two chlorine atoms.

4,931,200

MULTIPLE SOLUTION ADD-ON METHOD FOR INCREASING THE LEVEL OF ACTIVE DETERGENT SOLIDS IN A LAUNDRY DETERGENT SHEET

Gary L. Shanklin, Appleton, and Maung H. Win, Neenah, both of Wis., assignors to Kimberly-Clark Corporation, Neenah, Wis.

Filed May 3, 1988, Ser. No. 189,883
Int. Cl.[5] C11D *10/02, 11/00, 17/02, 17/06*
U.S. Cl. 252—91 9 Claims



1. A method for making a laundry detergent sheet comprising saturating a nonwoven web with liquid detergent and drying the web, wherein the liquid detergent is provided by two or more separate and different solutions, one of said solutions comprising active detergent solids and another of said solutions comprising detergent enhancers, said active detergent solids being selected from the group consisting of anionic, nonionic, cationic, and amphoteric surfactants.

4,931,201

WIPING CLOTH FOR CLEANING NON-ABRASIVE SURFACES

Jean Julemont, Heusy, Belgium, assignor to Colgate-Palmolive Company, Piscataway, N.J.

Filed Sep. 2, 1988, Ser. No. 239,767
Int. Cl.[5] C11D *17/06, 17/00*
U.S. Cl. 252—91 1 Claim

1. A semi-moist disposable wiping cloth for cleaning non-abrasive surfaces consisting essentially of 10–90% polymeric microfibers and 10–90% cellulose microfibers impregnated with about 3 grams of a 10 percent microemulsion consisting essentially of 0.5 percent fatty acid or distilled coconut oil, 0.05 percent of a 38 percent solution of Na_2O, 6.67 percent C_{14-17} sodium paraffin sulfonate in a 60 percent solution, 3 percent C_{13-15} fatty alcohol ethylene oxide, 1.5 percent magnesium sulfate heptahydrate, 2 percent formalin, 3.5 percent diethylene glycol monobutyl ether, 0.6 to 2 percent perfume and the balance of water, per gram of substrate.

4,931,202

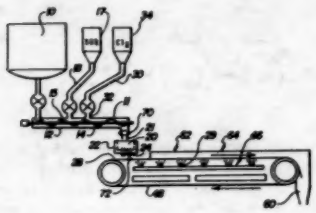
DETERGENT PELLET COMPOSITION AND PROCESS THEREFOR

Terrence Cotter, Southgate; Theodore Anderson, Grosse Ile; Robert Gansser, Riverview, all of Mich.; Lewis R. Kryk, Windsor, Canada, and Theodore R. Rieple, Farmington Hills, Mich., assignors to Diversey Corporation, Mississauga, Canada

Filed Jul. 7, 1988, Ser. No. 215,985
Int. Cl.[5] C11D *7/54*
U.S. Cl. 252—99 10 Claims

1. A process for manufacturing a highly alkaline detergent pellet and chlorine pellet mixture, comprising:

(a) preparing a first quantity of pellets containing a caustic and a hardness sequestering agent by:
(i) heating a concentrated aqueous alkaline material selected from the group consisting of alkali metal hydroxides, and mixtures thereof to an elevated temperature;
(ii) admixing a sequestrant with the alkali metal hydroxide to form a detergent mixture;
(iii) dispensing the concentrated aqueous alkaline material into a feed tube;



(iv) dropping droplets of the mixture from feed tube box onto a chill belt to form solid pellets thereof, consisting essentially of alkaline material and sequestrant;
(b) measuring a second quantity of pre-prepared chlorine pellets;
(c) admixing together a measured amount of the first quantity and the second quantity of pellets.

4,931,203

AUTOMATIC DISHWASHING DETERGENT POWDER BY SPRAYING DRYING AND POST-ADDING NONIONIC DETERGENT

Fahim U. Ahmed, Dayton; Charles E. Buck, Caldwell; Michael A. Camara, Jackson; James F. Cush, Jr., Washington Twp., Bergen County, and James A. Kaeser, Somerset, all of N.J., assignors to Colgate-Palmolive Company, New York, N.Y.

Continuation of Ser. No. 223,735, Jul. 15, 1988, abandoned, which is a continuation of Ser. No. 58,297, Jun. 5, 1987, abandoned. This application Mar. 27, 1989, Ser. No. 330,928

Int. Cl.[5] C11D *3/075, 3/08, 3/395, 11/02*

U.S. Cl. 252—99 **9 Claims**

1. A method for making a free-flowing automatic dishwashing composition comprising preparing an aqueous slurry of water-soluble inorganic phosphate and a minor amount of a water-soluble polymer, spray drying said slurry to form essentially hollow beads, absorbing thereon from 2% to 40% by weight based on the weight of the beads of a non-ionic surfactant having a melting point below about 150° C. by spraying said non-ionic in liquefied form onto said beads and thereafter dry mixing said beads with powdered sodium silicate in an amount of 2% to 40% by weight.

4,931,204

SELF-FOAMING OIL COMPOSITIONS AND PROCESS FOR MAKING AND USING SAME

Jose E. Ramirez, Trumbull, and Mohan Vishnupad, Monroe, both of Conn., assignors to Imaginative Research Associates, Inc., Bridgeport, Conn.

Filed Nov. 14, 1988, Ser. No. 270,263

Int. Cl.[5] C11D *3/18, 3/43, 3/44, 3/48*

U.S. Cl. 252—167 **18 Claims**

1. Aqueous, lotion-like, flowable liquid oil-in-water dispersion or emulsion composition, containing large amounts of oil or oil/wax mixture, which is capable of being contained within a non-pressurized container without self-foaming and capable of being poured onto a surface and spread as a thin layer to self-develop a copious foam, said compositions comprising an aqueous emulsion or dispersion having a continuous aqueous phase and a discontinuous phase comprising at least about 10% by weight based upon the total weight of the composition, of at least one oil or oil/wax mixture, at least about 5% by weight based upon the total composition, of a volatile organic foam-producing liquid which has an evaporation temperature at or slightly above ambient room temperature, and at least about 5% by weight based upon the total weight of the composition, of at least one anionic surface active agent selected from the group consisting of sodium methyl cocoyl taurate, disodium cocamido mono isopropanolamide sulfosuccinate, sodium lauryl sulfoacetate and dioctyl sodium sulfoccinate which increases the solubility of said foam-producing liquid in the oil or oil/wax mixture of said discontinuous phase, and water comprising said continuous aqueous phase.

4,931,205

TERTIARY THIOL ETHOXYLATE COMPOSITIONS

Charles L. Edwards; Herbert E. Fried, and Werner Lilienthal, all of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

Filed Aug. 9, 1988, Ser. No. 230,809

Int. Cl.[5] C07C *148/00*

U.S. Cl. 252—174.21 **18 Claims**

1. A tertiary thiol ethoxylate composition having improved detergency properties and formulability, said composition comprising a mixture of ethoxylates of C_9 to C_{16} tertiary thiols under conditions that
(a) the average ethylene oxide adduct number of the C_9 to C_{16} tertiary thiol ethoxylates is in the range from about 5 to 12 inclusive,
(b) the concentration of C_9 to C_{16} tertiary thiols in the compositions is less than about 0.08 percent by weight,
(c) the concentration of the thiol ethoxylates having an ethylene oxide adduct number of one is less than about 0.1 percent by weight,
(d) the concentration of the thiol ethoxylates having an adduct number of two is less than about 0.1 percent by weight, and
(e) the concentration of the thiol ethoxylates having an ethylene oxide adduct number of three is less than about 1.6 percent by weight,
with each of such percentages calculated on the basis of the total weight of C_9 to C_{16} tertiary thiol ethoxylates present in the composition.

4,931,206

BOILER WATER TREATMENT COMPOSITION

Alexander C. McDonald, The Woodlands, and James L. Soos, Conroe, both of Tex., assignors to Betz Laboratories, Inc., Trevose, Pa.

Continuation-in-part of Ser. No. 168,288, Mar. 15, 1988, Pat. No. 4,828,713. This application Feb. 21, 1989, Ser. No. 313,642

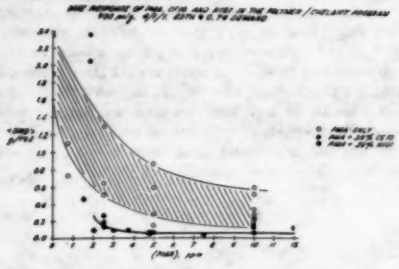
The portion of the term of this patent subsequent to May 23, 2006, has been disclaimed.

Int. Cl.[5] C02F *5/14*

U.S. Cl. 252—180 **34 Claims**

1. A synergistic composition for controlling the formation and deposition of materials, including salts of calcium, magnesium and iron or the structural parts of a steam generating system containing an aqueous system, which materials would deposit and/or form and deposit under steam generating conditions consisting essentially of: a water soluble methacrylic acid-containing polymer containing from about 5 to 100 mole % of methacrylic acid, a chelant selected from ethylenediaminetetraacetic acid, nitrilotriaacetic acid, and hydroxyethylethylenediaminetetraacetic acid, and water-soluble salts thereof and/or a water soluble phosphate generating com-

pound; and a nonionic surfactant wherein the amount of said chelant and/or phosphate and said surfactant in said composi-



tion synergistically enhances the dispersant activity of said polymer in said system.

4,931,207

BLEACHING AND BLUING COMPOSITION AND METHOD

Randall J. Cramer, Hayward, and Blanca L. Haendler, Livermore, both of Calif., assignors to The Clorox Company, Oakland, Calif.

Continuation of Ser. No. 89,927, Aug. 25, 1987, abandoned, which is a continuation of Ser. No. 840,974, Mar. 13, 1986, abandoned, which is a continuation of Ser. No. 574,565, Jan. 27, 1984, abandoned. This application Jul. 18, 1988, Ser. No. 220,979

Int. Cl.[5] A01N *59/08*

U.S. Cl. 252—187.26 **11 Claims**

1. A bleaching and coloring composition comprising:

an aqueous solution, said aqueous solution having from about 1 wt. % to about 10 wt. % of a hypochlorite salt dissolved therein;

a particulate pigment, said particulate pigment in an amount of from about 0.005 wt. % to about 1 wt. % with respect to the aqueous solution, said particulate pigment being substantially water-insoluble and including an aluminosilicate, a zeolite, or a metal oxide; and,

a polymer dispersed in the aqueous solution, said polymer forming a matrix in which particles of said pigment are entrapped and stably suspended in the aqueous solution and being in an amount of from about 0.4 wt. % to about 5 wt. % with respect to the aqueous solution, the polymer being a modified polyethylene compound selected from the group consisting of oxidized polyethylene having a molecular weight between about 400 and 3,000, polyethylene-acrylic acid copolymers having a molecular weight between about 500 and 6,000, and mixture thereof, the polymer adapted to release the particulate pigment when the aqueous solution is sufficiently diluted.

4,931,208

FERROELECTRIC CHIRAL SMECTIC LIQUID CRYSTAL COMPOSITION

Kenji Furukawa, Yokosukashi, and Kanetsugu Terashima, Yokohamashi, both of Japan, assignors to Chisso Corporation, Osaka and Hitachi, Ltd., Tokyo, both of, Japan

Division of Ser. No. 124,588, Nov. 24, 1987, Pat. No. 4,780,241, which is a continuation of Ser. No. 786,697, Oct. 11, 1985, abandoned. This application Aug. 3, 1988, Ser. No. 227,912

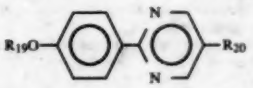
Claims priority, application Japan, Oct. 18, 1984, 59-219152; Feb. 25, 1985, 60-36003

Int. Cl.[5] C09K *19/34, 19/12, 19/20*; G02F *1/13*

U.S. Cl. 252—299.61 **2 Claims**

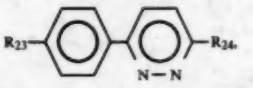
1. A ferroelectric chiral smectic liquid crystal composition comprising:

(1) 30–99% by weight of at least one member selected from the group consisting of compounds expressed by the general formulas:



(XII)

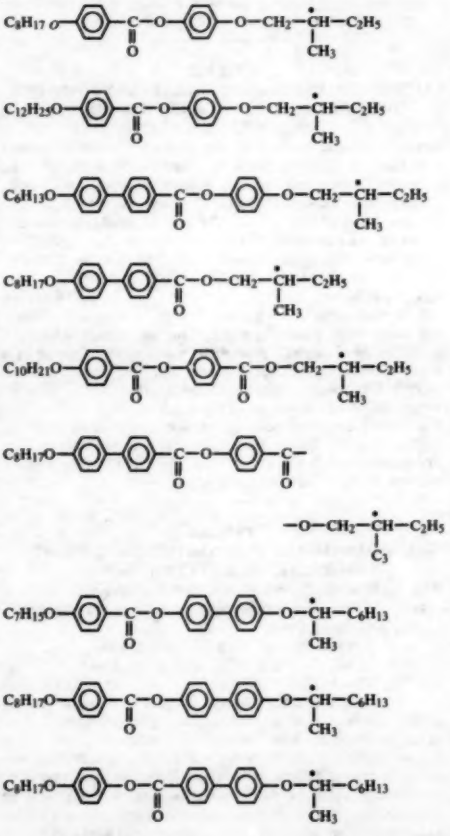
and



(XIV)

wherein R_{19} represents an alkyl group having 9–18 carbon atoms; R_{20} represents an alkyl group having 7–18 carbon atoms; R_{23} represents an alkyl or an alkyloxy group having 6–18 carbon atoms; and R_{24} represents an alkyl group having 5–18 carbon atoms, said at least one member having a nonchiral smectic C phase, and

(2) 70–1% by weight of at least one chiral smectic C liquid crystal compound selected from the group consisting of:



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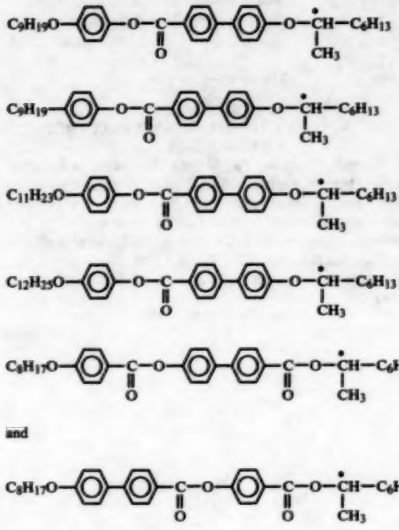


and

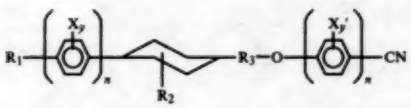
4,931,209

LIQUID CRYSTALLINE MATERIALS AND METHOD OF MAKING

Joseph P. Ferrato, and Julie C. Ferrato, both of Akron, Ohio, assignors to Crystaloid Electronics, Inc., Hudson, Ohio

Filed Sep. 25, 1986, Ser. No. 911,318
Int. Cl.[5] G02F 1/13; C09K 19/30; C07C 121/60, 121/48, 121/75
U.S. Cl. 252—299.63 7 Claims

1. A compound suitable for use as a liquid crystal having the formula:



where R_1 is alkyl or alkoxy of 1 to 8 carbon atoms, alkylcyclohexyl of 7 to 12 carbon atoms, hydrogen, chloride or cyano, R_2 is alkyl alkoxy of 1 to 3 carbon atoms, halide, or cyano and is present at the 2 or 3 position of the transcyclohexyl ring, R_3 is methylene, n is 1, 2 or 3, and X_y is an alkyl, alkoxy, halogen or cyano group that has replaced hydrogen in the ring and each of y designates the number of hydrogens that has been replaced on each ring and has values up to 4 and R_1, R_2, X_y and X_y' can be the same or different radicals.

4,931,210

PROCESS FOR PRODUCING A W/O/W TYPE MULTIPLE EMULSION FOR MEDICINES, COSMETICS, ETC.

Yasuyuki Takahashi; Toshiro Yoshida, and Takeshi Takahashi, all of Tokyo, Japan, assignors to Meiji Milk Products Company Limited, Tokyo, Japan

Division of Ser. No. 795,357, Oct. 15, 1985, abandoned. This application Sep. 19, 1988, Ser. No. 247,116
The portion of the term of this patent subsequent to May 20, 2003, has been disclaimed.
Int. Cl.[5] B01J 13/00; A23L 1/24
U.S. Cl. 252—314 2 Claims

1. A process for producing a W/O/W type multiple emulsion useful for the production of medicines and cosmetics, comprising the steps of:

(a) adding polyglycerol polyricinoleate to an oil phase and stirring;

(b) adding an aqueous phase to the product obtained by step (a) and forming a W/O emulsion by agitating or stirring;

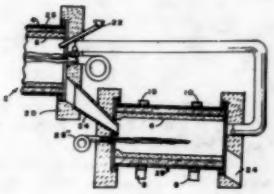
(c) inverting said W/O emulsion into the W/O/W emulsion by agitating.

4,931,211

PROCESS OF EXPANDING OBSIDIAN

Alfred J. Martenson, Richland, and William J. Johnson, Kennewick, both of Wash., assignors to Pyrofoam, Inc., Kennewick, Wash.

Filed Jun. 24, 1986, Ser. No. 878,098
Int. Cl.[5] C04B 20/06
U.S. Cl. 252—378 R 9 Claims



1. A method of expanding obsidian utilizing one refractory-lined rotary kiln which comprises:

(a) feeding finely divided obsidian into one end of such a kiln;

(b) feeding anti-sticking dust into at least one end of said a kiln;

(c) introducing a first pressurized flame into the other end of said kiln in the direction of said one end;

(d) gradually heating said obsidian by said first flame to a temperature of about 1900° F; and

(e) subjecting said obsidian to a second flame at a temperature of about 2400° F. to 2500° F. for a very few minutes.

4,931,212

PROCESS FOR CONTINUOUS REGULATION OF THE POWER WITH WHICH PASTES INTENDED FOR THE FABRICATION OF CARBONACEOUS AGGLOMERATES ARE MIXED

Jean-Louis Lemarchand, St. Jean de Maurienne, France, assignor to Aluminium Pechiney, Paris, France

Filed Aug. 13, 1984, Ser. No. 640,114
Claims priority, application Luxembourg, Mar. 19, 1984, 85 258
Int. Cl.[5] H01B 1/02
U.S. Cl. 252—502 9 Claims

1. In a process for the production of pastes which are intended for the fabrication of carbonaceous agglomerates in a

continuous mixing sequence, said pastes comprising a mixture of carbonaceous particles and an organic binder which is introduced in solid or liquid state, wherein the mixer comprises a tubular body provided on its inside surface with a plurality of fixed teeth which are slanted in relation to the axis of the tubular body, and mounted within said tubular body, a rotating shaft coaxial with the tubular body actuated with a back and forth movement synchronized with a rotary movement produced by a direct current motor, this shaft being provided with teeth cooperating with the fixed teeth to provide mixing and flow to the carbonaceous paste, wherein the mixer is provided with an aperture for discharge of said pastes, the degree of opening of the aperture being set by motorized flaps,

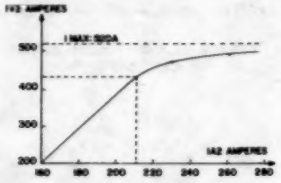
the continuous regulation of the power for mixing comprising the steps of:

a. setting the value of the mixing force which is to be applied to the carbonaceous paste in kilowatt-hours per ton, and setting the timed flow of the mixer and the set point intensity C of the current feed to the motor;

b. starting up the mixer;

c. measuring the current consumed by the motor, which is proportional to the power, the motor being supplied direct current at an esaentially constant voltage;

d. taking four readings of current IV1, IV2, IA1, and IA2, in each cycle of back and forth movement of the shaft,



wherein

readings IV1 and IV2 are taken when the shaft is in the forward position and IA1 and IA2 are taken when the shaft is in the back position,

IV1 being measured at the moment when the movable teeth of the shaft arrive practically in contact, through a layer of carbonaceous paste, with the fixed teeth, and when the paste is being extruded from the mixer,

IV2 being measured when the intensity passes through a first minimum corresponding essentially to the beginning of the return movement of the shaft,

IA1 being measured during return movement, when the movable teeth of the shaft begin to compress the carbonaceous paste against the corresponding fixed teeth at the rear,

IA2 being measured when the intensity passes through a second minimum corresponding to the moment when, the shaft having reversed its movement, the movable teeth pass between the fixed teeth; and

e. introducing the I_n value of current at IV2 measured in the course of the n cycle into the algorithm of regulation, from which the regulator determines the rate of opening of the flaps.

4,931,213

ELECTRICALLY-CONDUCTIVE TITANIUM SUBOXIDES

Richard B. Cass, R.D. 1, Box 545, Ringoes, N.J. 08551

Filed Jan. 23, 1987, Ser. No. 6,119

Int. Cl.[5] A01B *1/0*

U.S. Cl. 252—507 **32 Claims**

1. A process for producing a ceramic material which is electrically conductive comprising forming an electrically-conductive, titanium-containing ceramic product by reacting titanium dioxide with intercalated graphite under conditions which effect said reaction and the reduction of the titanium dioxide and recovering said product which includes therein titanium having a valence less than four.

23. A process according to claim 22 wherein said intercalant comprises about 6 to about 10 wt.% of the intercalated graphite.

4,931,214

OXIDIC BODIES WITH IONIC AND ELECTRONIC CONDUCTIVITY

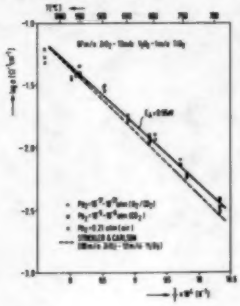
Wayne Worrell, Norbeth, Pa.; Werner Weppner, and Helmut Schubert, both of Stuttgart, Fed. Rep. of Germany, assignors to Max-Planck-Gesellschaft zur Foerderung der Wissenschaften e.V., Goettingen, Fed. Rep. of Germany

Continuation of Ser. No. 782,554, Oct. 1, 1985, abandoned. This application Apr. 22, 1988, Ser. No. 186,764

Claims priority, application Fed. Rep. of Germany, Oct. 5, 1984, 3436597

Int. Cl.[5] H01B *1/06*

U.S. Cl. 252—520 **19 Claims**



1. A mixed conductive oxidic body having a conductivity independent of oxygen pressure consisting of both ionic and electronic conductivity comprising:

98 to 25 mole-% of cubic or tetragonal zirconium dioxide;

1.5 to 25 mole-% of an oxide stabilizing the zirconium dioxide phase; and

.5 to 50 mole-% of at least one oxide of a metal of Group Va and VIa of the Periodic System of Elements, titanium dioxide or a mixture thereof.

4,931,215

DETERGENT COMPOSITIONS CONTAINING A COMBINATION OF A CO-BUILDER AND A BUILDER

Jadwiga Palicka, Lidingö , Sweden, assignor to Berol Nobel AB, Stenungsund, Sweden

Filed Oct. 17, 1988, Ser. No. 258,494

Claims priority, application Sweden, Oct. 26, 1987, 8704148

Int. Cl.[5] C11D *3/12, 3/33*

U.S. Cl. 252—546 **11 Claims**

7. A detergent composition comprising as main components from 5 to 30 percent by weight of an amphoteric compound having the general formula

$$R-(A)_n-[N-(CHR_1)_x]_y-N-Q$$
$$\qquad\qquad\quad |\qquad\qquad\quad |$$
$$\qquad\qquad\quad B\qquad\qquad\quad B$$

wherein R is a hydrocarbon group having 7 to 22 carbon atoms, A is the gorup (C(O)) or the gorup (OCH_2CH_2) and n is 0 or 1, R_1 is hydrogen or a lower alkyl group, x is 2 or 3, y is 2, 3 or 4, Q is the group $—R_2COOM$ wherein R_2 is an alkylene group having 1 to 6 carbon atoms and M is hydrogen or an ion from the groups alkali metals, alkaline earth metals, ammonium and substituted ammonium, and B is hydrogen or a group

Q as defined, from 12 to 30 percent by weight of zeolite, from 5 to 20 percent of nonionic tensides, from 6 to 20 percent by weight of bleaching agents and from 20 to 50 percent by weight of filler, the main components being used in proportion to each other to 100 percent by weight and the weight ratio between amphoteric compound and zeolite being at least 1:20.

4,931,216

DETERGENT COMPOSITION COMPRISING AN ANIONIC OR AMPHOTERIC SURFACE ACTIVE AGENT AND A BRANCHED QUATERNARY AMMONIUM SALT

Saboko Igarashi, Tokyo; Hidekazu Ogino, Koutoubashi, and Hajime Hirota, Tokyo, all of Japan, assignors to Kao Corporation, Tokyo, Japan

Filed Oct. 27, 1988, Ser. No. 263,351

Claims priority, application Japan, Oct. 29, 1987, 62-274054; Jan. 20, 1988, 63-10291

Int. Cl.[5] C11D *1/65, 3/37*

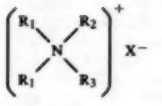
U.S. Cl. 252—547 **3 Claims**

1. A detergent composition comprising:

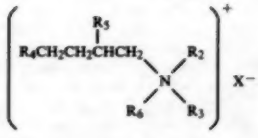
(A) 0.1 to 40% by weight of at least one kind of anionic or amphoteric surface active agents and

(B) 0.05 to 4% by weight of at least one kind of quaternary ammonium salts represented by the following formula (I) or (II):

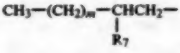
(I)



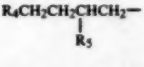
(II)



wherein R_1 represents a mixture of (a) a branched alkyl group represented by



and (b) a linear alkyl group represented by $CH_3—(CH_2)_n—$ (wherein R_7 represents a methyl or ethyl group, m is an integer to make the carbon atom content of the branched alkyl group to 8 to 16, and n is an integer of 7 to 15), with a ratio (a)/(a)+(b) being 0.1 to 1, R_2 and R_3 independently represent a benzyl group, an alkyl group having 1 to 3 carbon atoms, or a hydroxyalkyl group having 1 to 3 carbon atoms, R_4 and R_5 independently represent an alkyl group having 2 to 12 carbon atoms, R_6 represents a group



or an alkyl group having 1 to 3 carbon atoms, and X represents a halogen ion or an organic anion.

4,931,217

AUTOMATIC DISHWASHING DETERGENT COMPRISING QUATERNARY AMMONIUM SALT

Hidde Frankena, Vlaardingen, Netherlands, assignor to Lever Brothers Company, New York, N.Y.

Filed Nov. 28, 1988, Ser. No. 276,974

Claims priority, application United Kingdom, Nov. 26, 1987, 8727659

Int. Cl.[5] C11D *1/62, 3/395*

U.S. Cl. 252—547 **6 Claims**

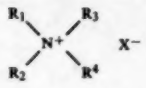
1. A detergent cleaning composition adapted for use in automatic dishwashing machines comprising:

(a) from 10 to 90 wt% of a combination of a builder and an alkalinity agent;

(b) from 3 to 15 wt% of a bleaching agent;

(c) from 0.2 to 10 wt% of a nonionic surfactant;

(d) 0.05-20wt % of a quaternary ammonium salt of general formula:



wherein from one to three members of R_1, R_2, R_3 and R_4 represent alkylrchains which may be the same or different, at least one of said alkyl groups representing a C_8–C_{26} group, those members of R_1, R_2, R_3 and R_4 which do not represent alkyl groups representing ethoxy groups, the total ethoxylation value within the molecule being at least 5 and X^- representing an anion, said composition being substantially free from anionic surfactant.

4,931,218

SULFATED HYDROXY MIXED ETHERS, A PROCESS FOR THEIR PRODUCTION, AND THEIR USE

Gilbert Schenker, Erkrath; Robert Piorr, Duesseldorf, and Sabine Luettge, Moenchen-Gladbach, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Filed Jul. 13, 1988, Ser. No. 218,719

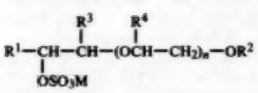
Claims priority, application Fed. Rep. of Germany, Jul. 15, 1987, 3723354

Int. Cl.[5] C11D *1/29, 1/37, 11/04*

U.S. Cl. 252—551 **39 Claims**

1. A sulfated hydroxyalkyl polyethylene glycol or hydroxyalkyl polypropylene glycol ether of the formula

(II)



in which

R^1 is hydrogen or a linear C_1–C_{16} alkyl radical,

R^2 is a linear or branched, saturated C_1–C_{22} alkyl radical,

R^3 is hydrogen or a linear C_1–C_{16} alkyl radical,

R_4 is hydrogen or a methyl group,

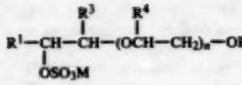
M represents hydrogen, ammonium, alkylammonium, alkanolammonium, in which the alkyl and alkanol radicals each contain from 1 to 4 carbon atoms, or a monovalent metal atom, and

n is a number of from 1 to 30.

with the proviso that the total number of carbon atoms in R^1 and R^3 is between 6 and 16,

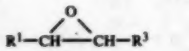
and mixtures of such compounds.

18. A process for the preparation of a sulfated hydroxyalkyl polyethylene glycol or hydroxyalkyl polypropylene glycol ether of the formula



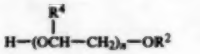
(II)

in which
R^1 is hydrogen or a linear C_1–C_{16} alkyl radical,
R^2 is a linear or branched, saturated C_1–C_{22} alkyl radical,
R^3 is a hydrogen or a linear C_1–C_{16} alkyl radical,
R^4 is hydrogen or a methyl group,
M represents hydrogen, ammonium, alkylammonium, alkanolammonium, in which the alkyl and alkanol radicals each contain from 1 to 4 carbon atoms, or a monovalent metal atom, and
n is a number of from 0 to 12,
with the proviso that the total number of carbon atoms in R^1 and R^3 is between 6 and 16,
and mixtures of such compounds, comprising the steps of
A. reacting an epoxide or mixture of epoxides of the formula



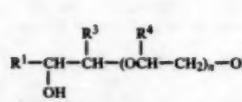
(III)

in which
R^1 and R^3 are as defined above,
with an alcohol or alcohol alkoxylate, or mixtures thereof, of the formula



(IV)

in which
R^2, R^4, and n are as defined above,
at an elevated temperature in the presence of a catalyst to form a hydroxyalkyl polyethylene glycol or a hydroxyalkyl polypropylene glycol ether, or mixtures thereof, of the formula



(I)

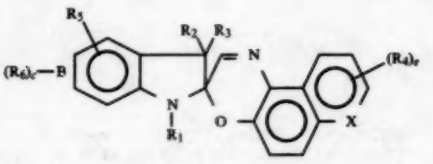
in which
R^1, R^2,R^3, R^4, and n are as defined above,
B. reacting the compound (I) or mixtures thereof with a sulfating agent to form a crude sulfonation product.
C. contacting the crude sulfonation product with an aqueous, basic solution, and maintaining the resulting mixture at an elevated temperature,
D. adjusting the mixture to a pH value in the nuetral or mildly alkaline range, and
E. isolating the compound or mixture of compounds of formula (II) from the reaction mixture.

4,931,219
PHOTOCHROMIC COMPOUND AND ARTICLES CONTAINING THE SAME

Patricia L. Kwiatkowski, and Won S. Kwak, both of Akron, Ohio, assignors to PPG Industries, Inc., Pittsburgh, Pa.

Continuation of Ser. No. 78,325, Jul. 27, 1987, abandoned. This application Jun. 12, 1989, Ser. No. 366,230
Int. Cl.[5] G02B 5/23
U.S. Cl. 252—586 **24 Claims**

17. A photochromic article comprising a solid transparent polymerized organic host material selected from the group consisting of polycarbonate, polymers of polyol(allyl carbonate), polymethylmethacrylate, cellulose acetate, cellulose propionate, cellulose butyrate, cellulose acetate butyrate, polystyrene, poly(styrene-metylmethacrylate) copolymer, and poly(styrene-acrylonitrile) copolymer, containing a photochromic amount of a photochromic compound represented by the graphic formula:



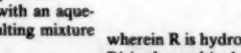
wherein:
(a) ring B is a benzene ring fused at the e or g face of the indoline moiety and X is carbon or nitrogen;
(b) R_1 is C_1–C_4 alkyl, cyano(C_2–C_4) alkyl or allyl:
(c) R_2 and R_3 are each C_1–C_5 alkyl or phenyl;
(d) each R_4 is C_1–C_2 alkyl, C_1–C_2 alkoxy, chloro, fluoro, bromo, nitro or trifluoromethyl when X is carbon; and is C_1–C_2 alkyl, C_1–C_2 alkoxy, chloro, fluoro, or bromo when X is nitrogen;
(e) R_5 is hydrogen, fluoro, trifluoromethyl or C_1–C_2 alkyl;
(f) R_6 is fluoro, trifluoromethyl, C_1–C_2 alkyl, or C_1–C_2 alkoxy; and
(g) e is 0 to 2, and c is 0 to 1.

4,931,220
ORGANIC PHOTOCHROMIC PIGMENT PARTICULATES

Ronald L. Haynes, Barberton; Charles H. Hoelscher, Doylestown, and Jonathan G. Lasch, Akron, all of Ohio, assignors to PPG Industries, Inc., Pittsburgh, Pa.

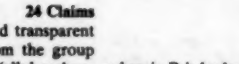
Filed Nov. 24, 1987, Ser. No. 124,718
Int. Cl.[5] G02B 5/23
U.S. Cl. 252—586 **16 Claims**

1. Photochromic particulate cross-linked thermostet resin having an average particle diameter between about 0.25 and 20 micrometers and having a photochromic amount of an organic photochromic substance uniformly dispersed throughout the particulate resin, said thermoset resin being a polymerizate of a polyfunctional acrylate monomer composition which is polymerized with a peroxygen or azo-type initiator in the presence of said photochromic substance, said polyfunctional acrylate monomer composition including at least one acrylate monomer represented by the following formula,



wherein R is hydrogen or methyl, n is the number 2, 3 or 4 and R′ is the multivalent radical remaining after removal of the hydroxy groups from a polyol having from 2 to 4 hydroxy groups.

8. A method for producing a photochromic particulate thermoset resin, which comprises dispersing a substantially uniform mixture of polyfunctional acrylate monomer composition and a photochromic amount of organic photochromic substance that is compatible with said monmer composition in an aqueous polymerization medium, polymerizing the monomer, with a peroxygen or azo-type initiator and separating finely-divided cross-linked thermoset photochromic particles from the polymerization medium, said polyfunctional acrylate monomer being represented by the following formula,



wherein R is hydrogen or methyl n is the number 2, 3 or 4 and

R' is the multivalent radical remaining after removal of the hydroxy groups from a polyol having from 2 to 4 hydroxy groups.

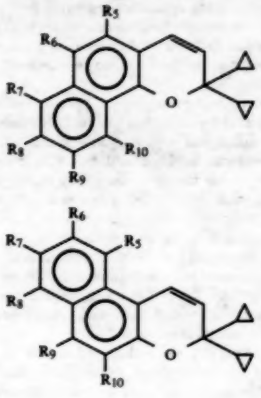
4,931,221

PHOTOCHROMIC SPIROPYRAN COMPOUNDS

Harry G. Heller, Cardiff, Wales, assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Dec. 30, 1988, Ser. No. 292,599
Int. Cl.[5] G02B 5/23
U.S. Cl. 252—586 **32 Claims**

18. A photochromic article comprising a solid transparent polymerized organic host material and a photochromic amount of each of (a) photochromic material selected from the group consisting of spiro(indolino) naphthoxazines and spiro(indolino) pyrido benzoxazines, and (b) photochromic material represented by one of the graphic formulae:



wherein R_5–R_{10} are each selected from the group consisting of hydrogen, C_1–C_5 alkyl, C_5–C_6 cycloalkyl C_1–C_3 alkoxy, chloro, bromo, phenyl, C_1–C_4 alkoxyphenyl, C_1–C_4 alkylphenyl, and chlorophenyl, the mole ratio of photochromic material (a) to photochromic material (b) being from about 1:3 to about 3:1.

4,931,222

PROCESS FOR TREATING RADIOACTIVE LIQUID WASTE CONTAINING SODIUM BORATE AND SOLIDIFIED RADIOACTIVE WASTE

Tsutomu Baba, Katsuta; Fumio Kawamura, Hitachi; Koichi Chino, Hitachi; Kiroyuki Tsuchiya, Hitachi; Makoto Kikuchi, Hitachi, and Shin Tamata, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 81,224, Aug. 4, 1987, abandoned. This application Jul. 24, 1989, Ser. No. 384,888
Claims priority, application Japan, Aug. 13, 1986, 62-188501
Int. Cl.[5] G21F 9/16, 9/08, 9/12, 9/14
U.S. Cl. 252—628 **14 Claims**

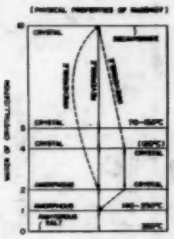
9. A process for treating radioactive liquid waste comprising the steps of:

(a) providing a radioactive liquid waste containing sodium borate as the main component;

(b) charging a thin film evaporator having a heat transfer surface and rotor means for contacting said heat transfer surface with the radioactive liquid waste containing sodium borate as the main component;

(c) heating the heat transfer surface on the thin film evaporator to a temperature lower than 150° C. thereby drying the liquid waste containing sodium borate into a solid sodium borate waste residue;

(d) rotating said rotor means thereby pulverizing the solid sodium borate waste residue into powdered form; and,



(e) packing the powdered sodium borate waste residue in a container with an inorganic solidifying agent to solidify the resulting mixture therein.

4,931,223

METHODS OF USING CHEMILUMINESCENT 1,2-DIOXETANES

Irena Y. Bronstein, Newton, and John C. Voyta, North Reading, both of Mass., assignors to Tropix, Inc., Bedford, Mass.

Continuation-in-part of Ser. No. 889,823, Jul. 24, 1986, and a continuation-in-part of Ser. No. 140,035, Dec. 31, 1987, and a continuation-in-part of Ser. No. 140,197, Dec. 31, 1987, abandoned. This application Jun. 30, 1988, Ser. No. 213,344
Int. Cl.[5] C07D 305/04, 407/04
U.S. Cl. 252—700 **19 Claims**

1. A process in which light of different wavelengths is simultaneously released from two or more enzymatically, chemically or electrochemically decomposable chemiluminescent 1,2-dioxetane compounds, at least one of said 1,2-dioxetane compounds being an enzymatically decomposable 1,2-dioxetane compound, said 1,2-dioxetane compounds being configured, by means of the inclusion of a different light emitting fluorophore in each of said 1,2-dioxetane compounds, to each emit upon decomposition light of said different wavelengths, which comprises decomposing each of said 1,2-dioxetane compounds by means of one of two or more different enzyme, chemical or electrochemical decomposing means, each of said decomposing means being specific to one of said 1,2-dioxetane compounds, at least one of said decomposing means being an enzyme decomposing means.

4,931,224

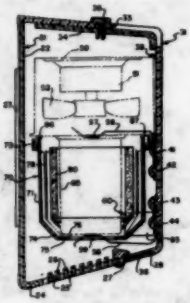
AIR FRESHENER

Charles R. Holzner, Sr., Chicago, Ill., assignor to Steiner Company, Inc., Chicago, Ill.

Filed May 9, 1989, Ser. No. 349,522
Int. Cl.[5] B01F 3/04
U.S. Cl. 261—30 **25 Claims**

1. In combination, an air freshener housing defining an internal space, said housing having mounted therein motor means operatively connected to a fan, a replaceable cartridge carrying a deodorizing substance positionable within said housing, anti-bootleg means including spaced prongs fixedly positioned within said housing to intrude into the space occupied by said replaceable cartridge, and receptacle means on said cartridge

complimentary in shape to said anti-bootleg means permitting insertion of a cartridge into said housing, whereby cartridges



without said receptacle means being prevent from fitting within said housing by said anti-bootleg means.

4,931,225

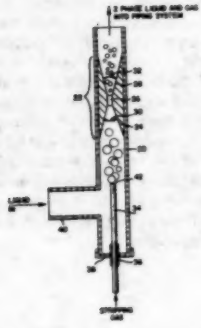
METHOD AND APPARATUS FOR DISPERSING A GAS INTO A LIQUID

Alan T. Cheng, Bloomfield, N.J., assignor to Union Carbide Industrial Gases Technology Corporation, Danbury, Conn.

Continuation-in-part of Ser. No. 139,462, Dec. 30, 1987, Pat. No. 4,861,352. This application Mar. 1, 1989, Ser. No. 317,577

Int. Cl.[5] B01F *3/04*

U.S. Cl. 261—76 **30 Claims**



1. An apparatus connected to a source of gas and liquid for dispersing said gas in said liquid, said apparatus comprising:

(a) at least one means for injecting said gas into said liquid, wherein said means injects said gas at a linear velocity which is at least sonic for at least a portion of said gas flow at the time said gas contacts said liquid, said injection means being located in communication with the entrance to a flow accelerating configuration; and

(b) at least one flow accelerating configuration for accelerating at least a portion a mixture of said gas and liquid flowing therethrough to sonic velocity, said flow accelerating configuration positioned so that gas injected by said gas injection means enters said flow accelerating configuration.

4,931,226

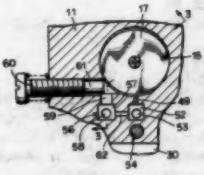
CHARGE FORMING APPARATUS

Kimio Ishii, Zama, Japan, assignor to Shinagawa Diecasting Co., Ltd., Japan

Filed Mar. 1, 1989, Ser. No. 317,327

Int. Cl.[5] F02M *3/06*

U.S. Cl. 261—41.5 **15 Claims**



1. A charge forming apparatus comprising:

a main fuel passage for feeding essentially liquid fuel from a fuel chamber to a main orifice located in a venturi portion of a mixing passage, said venturi portion being upstream of a throttle valve;

a supplemental fuel passage for supplying essentially liquid fuel from said fuel chamber to a fuel distribution chamber;

an idling orifice and a pair of low speed orifices in fluid communication between said fuel distribution chamber and said mixing passage, said idling orifice being downstream of said throttle valve and said pair of low speed orifices being upstream of said throttle valve when said throttle valve is in a closed position;

an air bypass passage in fluid communication at one end thereof with said mixing passage at a skirt portion thereof upstream of said throttle valve and in fluid communication at another end thereof with said mixing passage downstream of said throttle valve;

a manually operable valve disposed in said air bypass passage near said another end thereof for regulating the flow of air passing through said bypass passage in a stepless manner; and

a connecting passage for providing fluid communication between said supplemental fuel passage and said air bypass passage upstream of said manually operable valve.

4,931,227

MOLDING OF LIGHT REFLECTOR

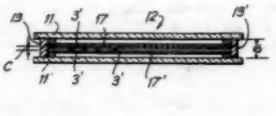
Sumio Nakahashi, Saijo; Fumihiko Miyamae, Shuso, and Nobuki Seike, Niihama, all of Japan, assignors to Nissan Chemical Industry Co., Ltd., Niihama, Japan

Division of Ser. No. 67,939, Jun. 29, 1987, Pat. No. 4,830,899. This application Oct. 14, 1988, Ser. No. 258,141

Claims priority, application Japan, Jul. 4, 1986, 61-158473; Nov. 6, 1986, 61-265284; Apr. 3, 1987, 62-51157

Int. Cl.[5] B29D *11/00*; B29C *39/02, 39/10*

U.S. Cl. 264—1.9 **4 Claims**



1. A method for manufacture of a light reflection material comprising a transparent body made of an organic glass having one or more thin through holes penetrating said body and being smooth on inner walls thereof, which method comprises setting a synthetic thread within a mold, pouring a liquid organic glass material into said mold, polymerizing and hardening the liquid organic glass material at a temperature higher than the temperature at which the thread undergoes thermal

deformation, and at a temperature lower than the melting point of said thread, taking the polymerized and hardened organic glass from the mold, and then pulling out or separating the thread from the glass.

4,931,228

METHOD OF MANUFACTURING SOFT CONTACT LENS BUTTONS

Edward M. Keeley, Huntington Beach, Calif., assignor to Coastvision, Huntington Beach, Calif.

Filed Apr. 5, 1989, Ser. No. 333,982
Int. Cl.[5] B29D *11/00*
U.S. Cl. 264—2.6 7 Claims

1. A process for manufacturing hydrophilic contact lens buttons, comprising the steps of:

dispensing a polymerizable monomeric mixture into molds;

loosely covering said molds so as to substantially limit convective air movement directly above said molds, yet prevent pressure build-up therein;

heating said covered, mixture-containing molds to a preselected temperature for a preselected period of time sufficient to facilitate polymerization of said mixture;

removing said polymerized mixture from said molds; and

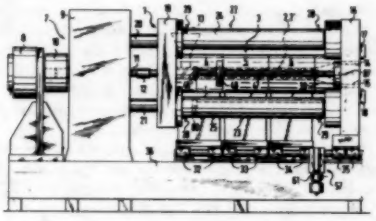
annealing the polymerized mixture whereby a strong tear resistant contact lens button results.

4,931,229

METHOD AND APPARATUS FOR PROTECTING A SCREW EXTRUDER PRODUCING STRAND-SHAPED EXPLOSIVES AND PROPELLANTS

Heinz Krimmel, Korntal; Manfred Muller-Sybrichs, Ditzinger; Rolf Schilling, Gerlingen, and Ulrich Weller, Bietigheim-Bissingen, all of Fed. Rep. of Germany, assignors to Werner & Pfleiderer GmbH, Stuttgart, Fed. Rep. of Germany

Filed Jun. 15, 1989, Ser. No. 366,739
Claims priority, application Fed. Rep. of Germany, Jun. 24, 1988, 3821311
Int. Cl.[5] C06B *21/00*
U.S. Cl. 264—3.3 19 Claims



1. A safety method for protecting a mixing apparatus in which strand-shaped explosives and propellants are produced by a screw extruder, said method comprising

forming a housing for a screw extruder of a mixing apparatus for the production of strand-shaped explosives and propellants of a plurality of separable housing parts,

clamping the housing parts together under hydraulic pressure,

driving screw shafts of the screw extruder in the housing with a determined torque to mix the material being processed,

continuously measuring the torque at which the screw shafts are driven,

measuring the temperature of the material in the housing after mixing by the screw shafts,

mesuring the pressure of the material in the housing after mixing by the screw shafts,

respectively comparing the measured values of torque, temperature and pressure with predetermined limit values thereof, and in the event any one of the measured values exceeds the respective limit value,

halting the drive of the screw shafts of the screw extruder, separating the screw shafts from the housing, and

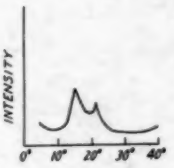
unclamping the housing parts by relieving the hydraulic pressure acting thereon.

4,931,230

METHOD FOR PREPARING RADIATION RESISTANT POLYPROPYLENE ARTICLES

Dennis L. Krueger; Thomas I. Insley; Daniel E. Meyer, and Richard J. Rolando, all of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 043,094, Apr. 30, 1987, abandoned, which is a continuation-in-part of Ser. No. 861,068, May 8, 1986, abandoned. This application Jan. 24, 1989, Ser. No. 302,126
Int. Cl.[5] B29C *47/88, 71/04*
U.S. Cl. 264—6 9 Claims



1. A method for preparing irradiated polypropylene articles comprising:

(a) extruding a polymer consisting essentially of polypropylene;

(b) quenching said extruded polypropylene immediately after extrusion to provide non-crystalline mesomorphous polypropylene; and

(c) irradiating said non-crystalline mesomorphous polypropylene with a dosage of ionizing radiation that would degrade crystalline polypropylene,

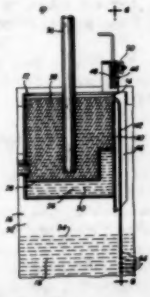
said irradiated articles being substantially undegraded after at least six months storage.

4,931,231

METHOD FOR MANUFACTURING DISCRETE PELLETS OF ASPHALTIC MATERIAL

Maynard Teppo, Belle Fourche, S. Dak., assignor to American Colloid Company, Arlington Heights, Ill.

Filed Apr. 22, 1985, Ser. No. 725,927
Int. Cl.[5] B29B *9/10*
U.S. Cl. 264—13 30 Claims



1. A method of manufacturing discrete solid particles of

asphaltic material in relatively dustless form having a substantially uniform particle size from a liquid asphaltic material comprising heating the asphaltic material to a temperature of at least 450 ° F. to maintain the asphaltic material in liquid form, and flowing the liquid asphaltic material by gravity as an elongated continuous stream into a cooling liquid having a temperature of 130° F. or below to solidify and shatter the stream into discrete solid particles in substantially dustless form.

4,931,232

COOLING PROCESS FOR A CONTINUOUSLY EXTRUDED PRODUCT

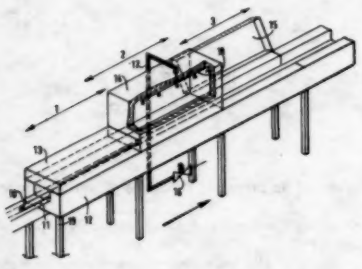
Andre Lermuzeaux, Sucy-en-Brie, and Patrice Barthelmes, Montigny-le-Bretonneux, both of France, assignors to L'air Liquide, Societe Anonyme pour l'etude et l'exploitation des Procedes Georges Claude, Paris, France

Filed Sep. 21, 1988, Ser. No. 246,792

Claims priority, application France, Sep. 21, 1987, 87 13047

Int. Cl.[5] B29C *35/16, 47/78*

U.S. Cl. 264—28 **4 Claims**



1. A process for the continuous cooling of an extruded product of elongated shape, comprising moving the product lengthwise through a cooling tunnel from an upstream end of the tunnel to a downstream end thereof while spraying onto the product a cryogenic substance in a phase denser than gaseous phase that vaporizes to a gas, and establishing in said tunnel at least three cooling zones comprising an upstream zone in which said product and a portion of said gas move countercurrently in contact with each other, a central zone in which said spraying is effected, and a downstream stabilization zone in which said product and another portion of said gas move cocurrently in contact with each other.

4,931,233

METHOD FOR ADDING ADDITIVES DURING MANUFACTURE OF CARBON FIBER

Naomasa Miyahara; Hiroyuki Nakamura, and Takashi Ohsaki, all of Tokyo, Japan, assignors to Nikkiso Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 940,045, Dec. 10, 1986, abandoned, which is a continuation-in-part of Ser. No. 799,908, Sep. 25, 1985, abandoned. This application Sep. 14, 1988, Ser. No. 245,986

Claims priority, application Japan, Sep. 26, 1984, 59-200967

Int. Cl.[5] D01F *9/22*

U.S. Cl. 264—29.2 **8 Claims**

1. In a process for production of carbon fiber which comprises spinning organic fiber, water-expanding said spun organic fiber accumulating the expanded spun organic fiber in a container without a lid for prevention of drying, taking out the accumulated organic fiber from said container and feed said organic fiber from said container and feeding said organic fiber to a flameproofing furnace and then feeding the organic fiber to a carbonizing furnace, the improvement comprising applying an oil additive in a volatile medium to the organic fiber after said organic fiber is removed from the container and while the volatile medium has not completely evaporated from the fiber and before said organic fiber is fed to the flameproofing furnace.

4,931,234

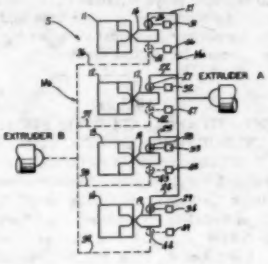
COINJECTION OF HOLLOW ARTICLES AND PREFORMS

Robert D. Schad, Toronto, and Paul P. Brown, Orangeville, both of Canada, assignors to Husky Injection Molding Systems Ltd., Ontario, Canada

Continuation of Ser. No. 72,767, Jul. 13, 1987, abandoned, which is a division of Ser. No. 862,269, May 12, 1986, Pat. No. 4,717,324. This application Feb. 6, 1989, Ser. No. 306,568

Int. Cl.[5] B29C *45/02, 45/16*

U.S. Cl. 264—40.1 **4 Claims**



1. In an injection molding machine including a multi-cavity mold where each cavity is fed by a coinjection nozzle having a plurality of insulated flow paths, said machine having means for controlling and measuring material flowing in each flow path, a method of molding layers of different thermoplastic materials in each mold cavity, layers of each material being molded individually and simultaneously in all cavities, said layers being molded in sequence into a multi-layered article, and at least one material having a substantially different process temperature, comprising the steps of:

providing individual sources of said different thermoplastic materials each properly and individually conditioned thermally for processing to avoid overheating or freezing,

providing a mold with a plurality of cavities,

selecting a number of individual and volumetrically precise quantities of a first material corresponding to the number of mold cavities,

selecting a number of individual and volumetrically precise quantities of a second material corresponding to the number of mold cavities, the volumetric sum of the individual quantities of the first and second materials being less than the total volume of an individual cavity,

feeding one precise quantity of said first material to each said mold cavity individually and simultaneously while said second material remains static,

thereafter feeding one precise quantity of said second material to each said mold cavity individually and simultaneously while said first material remains static, and,

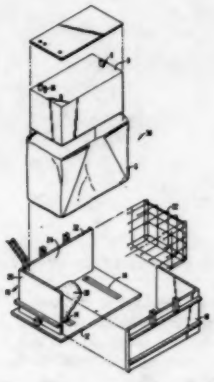
thereafter feeding an additional quantity of said first material to each said mold cavity individually and simultaneously in order to pack or fill each mold cavity completely to create said multi-layered article, wherein each different material fed to each said mold cavity is measured and controlled individually.

4,931,235

METHOD FOR MAKING STEEL/CONCRETE TANKS

Thomas A. Lindquist, Denair, and Ralph Bambacigno, Modesto, both of Calif., assignors to Convault, Inc., Denair, Calif.

Filed Mar. 6, 1989, Ser. No. 319,598
Int. Cl.[5] B28B 1/16
U.S. Cl. 264—40.1 8 Claims



1. A method for making a tank encased in concrete, comprising:

supporting said tank within a form structure to define a space between the tank and the form structure;

pouring a settable concrete in said space;

pressuring the interior of said tank to a superambient pressure at least during a time period before said settable concrete has substantially set, so as to expand said tank;

substantially maintaining said tank in pressurized state until said settable concrete has set; and

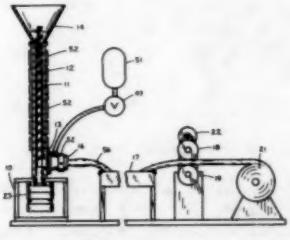
reducing said pressure in the interior of said tank to establish a space between said set concrete and said tank.

4,931,236

METHOD FOR FORMING IRRIGATION PIPE HAVING A POROUS SIDE WALL

Seibolt Hettinga, 2123 N.W. 111th St., Des Moines, Iowa 50322

Filed Mar. 10, 1989, Ser. No. 321,733
Int. Cl.[5] B29C 47/20
U.S. Cl. 264—41 3 Claims



1. The method of forming a porous plastic pipe comprising the steps of:

(a) mixing together two particulate incompatible plastic materials comprising a thermoplastic resin and a thermosetting resin having non-bonding composition characteristics,

(b) feeding said mixture into a heated extruding unit having a die head with a bore therein,

(c) extruding the pipe under a pressure of not less than about 600 p.s.i. and a temperature of not less than about 450° Fahrenheit,

(d) providing a gas supply tube with a section within said extruding unit extended axially of and projected outwardly from said bore to form an annular discharge outlet between the outer peripheral surface of said tube section and the inner peripheral surface of said bore defining the sidewall of the pipe,

(e) forming the outwardly projected portion of said section with a closed terminal end and a plurality of radially extended gas outlet passages, and

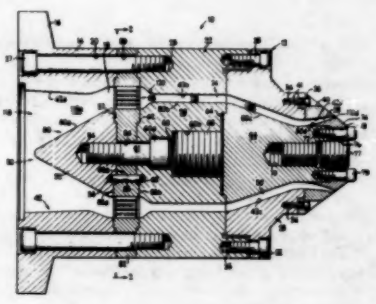
(f) supplying a nitrogen gas under pressure to said supply tube for discharge through said outlet passages to induce chilling of the thermoplastic and thermosetting resins in the mix to assist the flow of said nitrogen gas radially through the extruded pipe sidewall and into the atmosphere to form a maze of gas passages in said sidewall between the particles of said incompatible materials.

4,931,237

EXTRUSION DIE APPARATUS AND PROCESS FOR PRODUCING TUBULAR FILM FROM THERMOPLASTIC MOLTEN MATERIAL

Paul L. Peelman, Eau Claire, and Edward A. Malosh, Chippewa Falls, both of Wis., assignors to Amoco Corporation, Chicago, Ill.

Filed Jan. 23, 1989, Ser. No. 299,260
Int. Cl.[5] B29C 47/20
U.S. Cl. 264—48 21 Claims



1. An extrusion die apparatus for producing tubular film from thermoplastic molten material, comprising:

(a) a tubular housing having an axially aligned interior defining an inner surface;

(b) an elongated member including an outer surface disposed within said inner surface of said housing and spaced therefrom providing a passageway; and

(c) an alignment member having a plurality of annularly spaced feed ports defining an inside surface, said alignment member securely connected said elongated member to said housing, wherein said inner surface of said housing, said outer surface of said elongated member and said plurality of annularly spaced feed ports define an annular-axially aligned passageway, at least a portion of said annular-axially aligned passageway includes turbulating means having at least one twisting groove for forming a twisting passageway and allowing a balanced flow of thermoplastic material therethrough.

16. A process for producing tubular film from a thermoplastic molten material, comprising:

converting a cylindrical stream of thermoplastic material into a tubular stream;

mixing said tubular stream of thermoplastic material through an annular-elongated passageway having a plurality of axially aligned-annularly spaced feed ports;

funneling and recombining said tubular stream of thermoplastic material after being mixed through said feed ports;

passing said tubular stream through a twisting passageway in substantial alignment with said annular-elongated passageway to substantially evenly recombine said thermoplastic material; and

forming and withdrawing said tubular stream of thermoplastic material having a substantially uniform thickness throughout.

4,931,238

METHOD FOR MANUFACTURING A SINTERED BODY WITH HIGH DENSITY

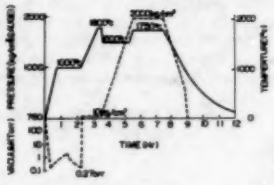
Hiroaki Nishio, and Takeshi Kawashima, both of Tokyo, Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 6, 1988, Ser. No. 203,239

Claims priority, application Japan, Jun. 12, 1987, 62-145323

Int. Cl.[5] C04B *35/64*

U.S. Cl. 264—62 **21 Claims**



1. A method for manufacturing a high density sintered body comprising:

dispersing a first powder in a first dispersion medium comprising substances capable of being extracted by a supercritical fluid to form a first slurry, and casting said first slurry to form a compact containing said first dispersion medium;

dispersing a second powder in a second dispersion medium comprising substances capable of being extracted by a supercritical fluid to form a second slurry, and coating the surface of said compact with said second slurry to form a film layer of said second slurry thereon;

extracting and removing said substances contained in the compact and said substances contained in the film layer with a supercritical fluid;

heating the fluid coated compact from which the substances have been extracted and removed to render said film layer on said compact gas impermeable; and

applying hot isostatic pressing to said compact having said gas impermeable film layer on the surface thereof to form a said high density sintered body.

4,931,239

ALUMINA FIBER STRUCTURE AND PROCESS FOR ITS PRODUCTION

Hisataka Hosoi, Joetsu; Hozumi Endo, Fujisawa; Tatsuo Ando, Yokohama, and Mamoru Shoji, Joetsu, all of Japan, assignors to Mitsubishi Kasei Corporation, Tokyo, Japan

Division of Ser. No. 800,026, Nov. 20, 1985, Pat. No. 4,752,515. This application Jun. 8, 1988, Ser. No. 178,604

Claims priority, application Japan, Jun. 17, 1985, 60-131580; Jul. 16, 1985, 60-156599; Jul. 19, 1985, 60-159966; Sep. 4, 1985, 60-195619

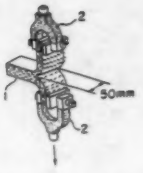
Int. Cl.[5] D01F *9/08*; D04H *1/46*

U.S. Cl. 264—63 **15 Claims**

1. A process for producing an alumina fiber structure, which comprises:

(A) preparing a flat structure of precursory fibers by:

(i) preparing precursory fibers by spinning a viscous spinning solution comprising compounds of metals including aluminum and an organic polymer compound in which the proportion of aluminum in the total metals in the solution corresponds to at least 65% by weight of alumina when all the metals are calculated as their oxides;



(ii) laying the precursory fibers into the structure of a laid mat;

(iii) applying a lubricant to the mat;

(iv) needling the lubricated mat; and

(B) burning the structure obtained at a temperature of at least 500° C. thereby converting the precursory fibers to alumina fibers which have an alumina content of at least 65% by weight, wherein said lubricant is a solution of a higher fatty acid ester in a hydrocarbon solvent.

4,931,240

METHOD FOR THE PRODUCTION OF A CARBON ELECTRODE

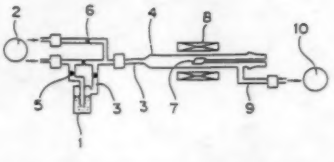
Yoshimitsu Tajima, and Motoo Mohri, both of Nara, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Sep. 19, 1988, Ser. No. 245,772

Claims priority, application Japan, Sep. 19, 1987, 62-235704

Int. Cl.[5] B29C *43/18*; B32B *31/20*; C01B *31/00*

U.S. Cl. 264—81 **14 Claims**



1. A method for the production of a carbon electrode comprising:

directly depositing a carbon material on an electroconductive electrode substrate by chemical vapor deposition using gaseous hydrocarbons as a starting material,

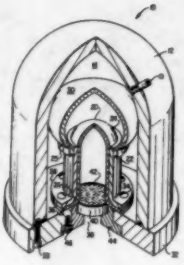
filling said carbon material directly deposited on said electrode substrate with a charge carrier material capable of being reversibly intercalated therein and deintercalated therefrom, and

compressing said electrode substrate filled with the charge carrier material, to produce a thin plate-shaped carbon electrode.

4,931,241
METHOD FOR PRODUCING STRUCTURES BY ISOSTATIC COMPRESSION

Douglas W. Freitag, Arlington, Tex., assignor to LTV Aerospace and Defense Company, Dallas, Tex.

Filed Aug. 6, 1987, Ser. No. 82,431
Int. Cl.[5] B28B *1/26, 7/06*
U.S. Cl. 264—86 25 Claims



1. In an isostatic compression process for forming compression structures, the steps comprising:

(a) establishing a suspension of colloidal size matrix powders in a carrier liquid;

(b) providing a die chamber comprising a self-supporting cage structure formed of material enabling the transmission of pressure from the exterior to the interior thereof and an expansible and conformable bladder within said cage structure, said die chamber having a filter opening and a filter disposed therein which is permeable to filtrate from said colloidal suspension under an applied pressure but substantially impermeable to said matrix powders;

(c) incorporating said colloidal suspension into the interior of said bladder; and

(d) isostatically imposing an elevated pressure on said bladder containing said colloidal suspension within said die chamber at a pressure sufficient to dispel carrier liquid filtrate through said filter opening and maintaining said pressure for period sufficient to expel at least 20% of the liquid originally contained in said colloidal suspension through said filter opening.

4,931,242
METHOD OF FORMING SHAPED-BODY TO BE SINTERED

Shoji Uchimura, Nagoya; Hironobu Amano, Tokohashi; Kazuhiro Ohta, Toyokawa; Hirohide Ishiguro, Gamogori; Takehiko Matsumoto, Shinshiro, and Takuya Ito, Toyokawa, all of Japan, assignors to Sintokogio, Ltd., Nagoya, Japan

Filed Nov. 29, 1988, Ser. No. 277,120
Claims priority, application Japan, Feb. 19, 1988, 63-37114
Int. Cl.[5] B28B *1/26, 7/36;* B29C *33/40*
U.S. Cl. 264—87 7 Claims

1. A method of forming a shaped-body to be sintered comprising the steps of:

forming a slurry comprising particles of a material to be shaped into the body to be sintered and a solvent suspending said particles;

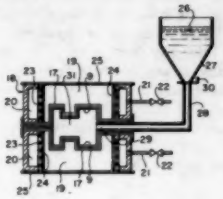
evenly moistening, with said solvent, a sheet-like shielding member permeable to said solvent, thereby swelling said shielding member and imparting flexibility and extensibility to said shielding member, which properties enable absorption and removal of said solvent from said slurry by said permeable shielding member during shaping of said slurry;

causing said swollen shielding member to be sucked onto and tightly adhered to a surface of a shape pattern plate;

disposing a molding frame on said swollen shielding member on the side thereof opposite to said shape pattern plate, and charging a filler, comprising a particulate substance, into said molding frame;

sealing the surface of said filler opposite to said swollen member and simultaneously producing a negative pressure within said molding frame, thereby causing said filler to fix under said negative pressure and simultaneously causing said shielding member and said filler to closely adhere together;

separating said shape pattern plate from said shielding member whereby preparing one half of a mold on said molding frame side;



joining said thus prepared one half of a mold to another half of said mold which has been prepared by the same steps as those mentioned above, thereby defining a cavity;

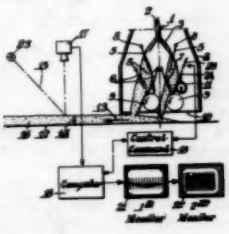
filling said cavity with said sluury comprising said particles to be sintered and said solvent absorbing and removing said solvent of said slurry through said shielding member by permeation of said solvent through said shielding member to form said shaped-body to be sintered with substantially even wall thickness from said slurry; then

taking out said shaped-body to be sintered from said mold.

4,931,243
PROCESS AND APPARATUS FOR SPREADING A CHIP WEB

Walter Henschel, Otzberg; Manfred Riesner, and Uwe Kunstmann, both of Rossdorf, all of Fed. Rep. of Germany, assignors to Carl Schenck AG, Fed. Rep. of Germany

Filed May 6, 1988, Ser. No. 191,041
Claims priority, application European Pat. Off., May 23, 1987, 87107526.3
Int. Cl.[5] D04H *1/72, 17/00*
U.S. Cl. 264—109 9 Claims



1. A process for spreading a chip web flowing in a continuous downward direction from a supply in a width corresponding to a desired web width onto a substrate moving below the supply according to a desired web height distribution across the web transverse to the direction of web travel, the process comprising the steps of flowing a chip mass in a continuous downward direction, dividing the chip mass into partial flows including changing the angular direction of downward flow of at least some of the partial flows, subdividing the partial flows

including changing the angular direction of downward flow of at least some of the subdivided flows, directly mixing the subdivided flows in cascades as a result of the angular directional changes of downward flow, and uniformly laying down the chip web of desired width onto the substrate.

3. Apparatus for spreading a chip web flowing from a supply in a width corresponding to a desired web width onto a substrate moving below the supply according to a desired web height distribution across the web transverse to the direction of web travel, the apparatus comprising a rake-like distribution device arranged between the supply and the substrate, a distribution chute next to the distribution device, one pair of spaced apart rakes inclined toward each other and arranged below the distribution chute, at least another pair of spaced apart rakes inclined toward each other and arranged below the other pair of rakes, each of the rake pairs dividing the chip web from the supply into partial streams, a chip pickup device located along one of the partial streams of chip flow for selectively collecting chips therefrom, the pickup device including a plurality of closable openings therein extending over the spreading width of the web, and gates over the openings controlling the size of the openings and thereby the amount of chips collected by the pickup device.

4,931,244

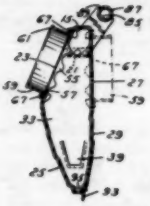
METHOD OF MAKING A UNIT NOZZLE HOUSING

James A. Belanger; Robert J. Wentworth, both of Northville; Barry S. Turner, Livonia, and Graham J. Astley, Novi, all of Mich., assignors to Belanger, Inc., Northville, Mich.

Division of Ser. No. 45,356, May 4, 1987, Pat. No. 4,798,008. This application Nov. 8, 1988, Ser. No. 268,413

Int. Cl.[5] **B28B** *1/48, 1/02;* **B29C** *41/20;* **B23P** *19/04*

U.S. Cl. 264—154 **1 Claim**



1. The method of making a pressurized unit nozzle housing of molded plastic material comprising the steps of:

(a) taking a mold which when closed has an interior cavity corresponding to the outer configuration of the unit molded nozzle housing;

(b) placing powdered or granular plastic material into said mold when open;

(c) inserting a plurality of spaced insert fasteners into the mold and closing the mold;

(d) subjecting the mold to heat to melt the plastic while rotating said mold to fill said cavity with the plastic melted material;

(e) cooling the mold to solidify the plastic and to thereby form a unit nozzle housing having a laterally elongated normally closed throated air outlet, whereby the fasteners are permanently embedded, enclosed within and anchored selectively within one of the front and rear walls of the unit molded nozzle housing;

(f) removing the molded nozzle housing from the mold, forming an opening by cutting a circular opening in one of the front and rear walls inwardly of the fasteners and cutting an elongate opening in the throated air outlet; and

(g) connecting a source of pressurized air to the circular opening, the fasteners being used to secure the source of pressurized air to the circular opening thus pressurizing the nozzle housing.

4,931,245

PROCESS FOR THE PRODUCTION OF A CONTAINER OR TUBE FITTED WITH A PUMP

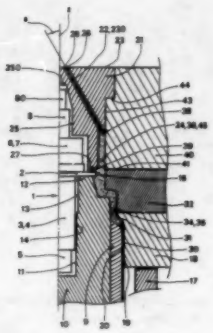
Bernard Schneider, Sainte Menehould, and Gérard Chapet, Paris, both of France, assignors to Cebal, Clichy, France

Filed May 4, 1989, Ser. No. 347,039

Claims priority, application France, May 6, 1988, 88 06603

Int. Cl.[5] **B29C** *45/14, 65/78*

U.S. Cl. 264—161 **15 Claims**



1. A process for the production of a tube (45) fitted with a pump (1) for dispensing of a product, said pump (1) having an annular fixing rim (2), said process comprising the steps of:

(a) retaining said pump (1) between at least a pair of opposed male mould die tools (10,21) to sealingly clamp said rim (2) and retain the pump (1) so as to limit heating thereof during a moulding operation;

(b) positioning a tube body (190) or skirt blank (19) around a male die tool (9), the end of said body (190) or said skirt (19) projecting beyond said tool (9);

(c) providing an assembly of a plurality of male die tools (9,10,21) and a plurality of female die tools (18,32,40) defining an annular space (24) within which is contained an outer portion of said annular rim (2) and the upper end of said body (190) or said skirt (19), which assembly includes a plurality of injection ducts (22) which open into said annular space (24); and

(d) introducing molten plastics material into said annular space (24) by way of said ducts (22), allowing the plastics material to cool and removing the resulting tube (45) from the mould.

4,931,246

METHOD FOR INJECTION MOLDING MULTI-LAYER ARTICLES

Frederick G. Kudert, Niles; Maurice G. Latreille, Batavia; Robert J. McHenry, St. Charles; George F. Nahill, Crystal Lake, all of Ill.; Henry Pfutzenreuter, III, Alta Loma, Calif.; William A. Tennant, Schaumburg, Ill.; Thomas T. Tung, Hoffman Estates, Ill., and John Vella, Jr., Aurora, Ill., assignors to American National Can Company, Chicago, Ill.

Division of Ser. No. 484,707, Apr. 13, 1983, Pat. No. 4,712,990. This application Sep. 19, 1986, Ser. No. 909,403

Int. Cl.[5] **B29C** *45/16*

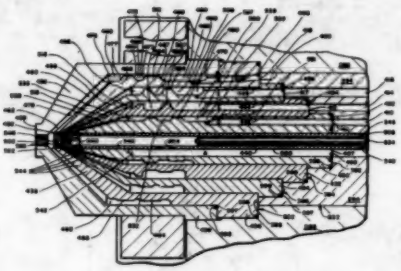
U.S. Cl. 264—241 **64 Claims**

1. A method of substantially simultaneously effecting the initiation. flow and termination of flow of corresponding melt streams of polymeric materials from a plurality of substantially identical, co-injection nozzles of a multi-co-injection nozzle injection molding machine to form a plurality of multi-layer injection molded plastic articles, which comprises

providing a melt stream of polymeric material for each corresponding layer of each of the articles to be formed,

feeding each melt stream of polymeric material which is to form a corresponding layer of each article, separately along a substantially equal flow path to each co-injection nozzle,

employing a common pressure source for each melt stream of a given polymeric material which is to form the corresponding layer in each of more than one article, for pressurizing the melt streams of given material substantially simultaneously in each co-injection nozzle and thereby



providing substantially the same flow of the given material to and from each of more than one co-injection nozzle,

positively effecting the initiation, flow and termination of flow of the given material substantially simultaneously and substantially identically in each co-injection nozzle by employing substantially identical individual value means in each co-injection nozzle, and

driving the valve means substantially at the same time and in the same manner in each co-injection nozzle.

4,931,247

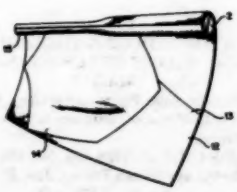
FABRICATION METHOD OF A HOLLOW RACKET MADE OF CARBON FIBER

Chien-Hwa Yeh, 4th Floor, 52, Chung-Cheng 3rd Road, Kaohsiung, Taiwan

Filed Dec. 19, 1988, Ser. No. 286,263

Int. Cl.[5] B29C *43/10, 43/20*

U.S. Cl. 264—258 **4 Claims**



1. A method of fabricating a hollow recreational product having a head and formed of discrete layers of fiber material comprising the steps of:

providing a epoxy resin impregnated first fibre sleeve tube about an elongated tubular mold of the product;

providing several discrete layers of overlapping epoxy resin impregnated fibre woven boards having lengths approximately equal to that of the length of the product;

rolling the fibre woven boards about said fibre sleeve tube;

providing a plurality of discrete layers of epoxy resin impregnated fibre woven boards shorter in length than the length of the product;

roiling these short layers about the head of the product;

mounting a second epoxy resin impregnated fibre sleeve tube about the outermost layer of rolled fibre woven boards;

sealing the head of the product with a fibre material;

removing said mold from within the first tube to form a hollow product;

inserting an air blowing tube into the hollow product;

blowing air into the tube to pressurize the product;

inserting the product into a die; and

heating the product within the die so as to harden and form a hollow product formed of fibre material.

4,931,248

METHOD OF MANUFACTURING AN OBJECT OF THERMOPLASTICS MATERIAL HAVING A DECORATIVE DESIGN

Albert Willemin, Le Landeron, Switzerland, assignor to ETA SA Fabriques d'Ebauches, Switzerland

PCT No. PCT/CH88/00104, § 371 Date Feb. 3, 1989, § 102(e) Date Feb. 3, 1989, PCT Pub. No. WO88/09714, PCT Pub. Date Dec. 15, 1988

PCT Filed Jun. 7, 1988, Ser. No. 328,200

Claims priority, application France, Jun. 12, 1987, 87 08261

Int. Cl.[5] B29C *45/14, 45/16*

U.S. Cl. 264—266 **4 Claims**

1. A method of manufacturing an object of thermoplastics material having a decorative design, said method comprising: printing said design onto a surface of a support using a transferable ink separable from said support in response to heating; introducing said support, after said printing, into a mould having the shape and dimensions of said object; introducing a separate film into the mould in a position to be applied against said printed surface of the support; and after introducing said support and said film, injecting said thermoplastics material into said mould at a temperature equal to or greater than its melting point; said introduction of said support being carried out so that, at least druing said injection, said support is applied against a wall of said mould with said printed surface turned facing the inside of the mould; said introduction of said film being carried out so that, at least during said injection, one surface of said film is applied against said printed surface of the support and the other surface of said film bonds itself to said thermoplastics material while the latter is at the temperature it has during said injection; and said transferable ink separating from said support and being deposited on and retained by said film in response to said ink being heated through said film by said injected thermoplastics material.

4,931,249

APPARATUS AND PROCESS FOR MIXING AND DISPENSING HIGH VISCOSITY, MULTIPLE COMPONENT REACTIVE LIQUIDS INTO A MOLD

Ronald G. Hune, Sugarland, Tex., assignor to Thermal Designs, Inc., Houston, Tex.

Continuation of Ser. No. 40,877, Apr. 20, 1987, abandoned. This application Apr. 3, 1989, Ser. No. 334,751

Int. Cl.[5] B29C *41/20, 45/13;* B67D *5/60*

U.S. Cl. 264—279.1 **3 Claims**

1. Apparatus for combining and dispensing a resin and a hardener in a predetermined volumetric proportion to form a fireproofing compound for application to a mold about a device to be fireproofed comprising,

a first tank containing a resin in a semi-liquid state of extremely high viscosity,

a second tank containing a hardener in a semi-liquid state of high viscosity,

a first gear pump means communicating with said first tank through a resin conduit having a first output capacity per revolution for metering said resin from said first tank to a first conduit,

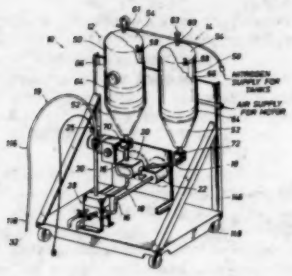
a second gear pump means communicating with said second tank through a hardener conduit having a second output

capacity per revolution for metering said hardener from said second tank to a second conduit,

means for turning said first and second pump means including

a motor having an output shaft about which a drive gear is mounted,

first and second equally sized gears secured respectively to said first and second gear pump means, said first and second gears being engaged with one of said first and second gears,



said gear pumps being bi-rotational, whereby said drive gear turns said one of said first and second gears in a first direction with the other of said first and second gears turning in a second direction,

mixing means for accepting said metered resin and said metered hardener from said first and second conduits for mixing said resin and hardener to form a fireproofing compound, and

flexible conduit means connected to said mixing means for transporting said fireproofing compound from said mixing means to said mold.

4,931,250

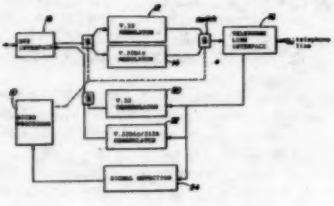
MULTIMODE MODEM

John A. Greszczuk, Roslindale, Mass., assignor to Codex Corporation, Canton, Mass.

Filed May 12, 1988, Ser. No. 192,952

Int. Cl.[5] H04B *1/38*

U.S. Cl. 375—8 **16 Claims**



9. A method for operating a multimode modem of the kind that communicates with a variety of modem types employing different initial handshake signals, comprising:

sending a sequence of signals corresponding to the variety of modem type handshake signals and terminating the sequence when the multimode modem receives a response that identifies a particular one of the variety of modem types; and

determining, simultaneously for at least two of said modem types, the particular type of modem from the received response.

4,931,251

EXPERIMENTAL NUCLEAR FUSION REACTOR

Kenji Watanabe, 2-3-2, Mitsukeyama, Ibaraki City, Osaka; Tadao Uyama, Minoo; Norio Satomi, Hirakata; Masahiro Nishikawa, Sakai; Satorou Yamaguchi, Tokyo, and Ichiro Nakazawa, Tokyo, all of Japan, assignors to Kenji Watanabe and Mitsubishi Denki Kabushiki Kaisha, both of, Japan

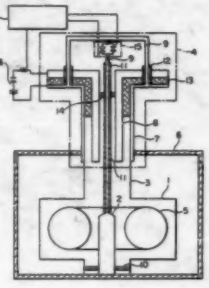
Continuation of Ser. No. 867,227, May 27, 1986, abandoned.

This application Mar. 6, 1989, Ser. No. 319,859

Claims priority, application Japan, May 29, 1985, 60-118175

Int. Cl.[5] G21B *1/00*

U.S. Cl. 376—128 **3 Claims**



1. An experimental nuclear fusion reactor comprising:

a coaxial plasma gun which has an outer electrode and an inner electrode arranged coaxially with each other,

a metallic container means, including a center conductor, for containing an annular plasma around said center conductor and holding a poloidal magnetic flux, said center conductor extending substantially the height of the plasma,

inlet means for introducing a plasma from said coaxial plasma gun into said container means,

conductor members which electrically connect said center conductor, either of said outer electrode and said inner electrode, said inlet means and said container means in succession so as to form a closed circuit, and

a device disposed in the closed circuit and including means for establishing current flow through said closed circuit to hold a toroidal magnetic flux of the annular plasma.

4,931,252

PROCESS FOR REDUCING THE DISPARITIES IN MECHANICAL VALUES OF TUNGSTEN-NICKEL-IRON ALLOYS

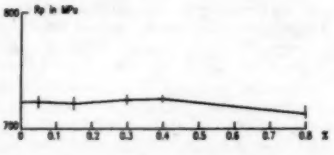
Laurent Brunisholz, Saint Pierre en Faucigny, and Guy Nicolas, Bonneville, both of France, assignors to Cime Bocuze, Paris la Defense, France

Filed May 27, 1988, Ser. No. 199,913

Claims priority, application France, Jun. 23, 1987, 87 09169

Int. Cl.[5] B22F *1/00*

U.S. Cl. 419—23 **8 Claims**



1. A process for reducing disparities of mechanical properties in tungsten-nickel-iron alloys containing in % by weight 85

to 99% of tungsten, 1 to 10% of nickel and 1 to 10% of iron, said alloys being obtained from tungsten, nickel and iron powders which have the same or different grain diameter, shape and size distribution, which comprises simultaneously adding an effective amount of each of cobalt and manganese powders to tungsten powder or to a mixture of tungsten, nickel and iron powders.

4,931,253

METHOD FOR PRODUCING ALPHA TITANIUM ALLOY PM ARTICLES

Daniel Eylon, Dayton; Francis H. Froes, Xenia, and Gerhard Welsch, Cleveland Heights, all of Ohio, assignors to United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Aug. 7, 1989, Ser. No. 392,673
Int. Cl.[5] B22F *1/00*
U.S. Cl. 419—25 5 Claims

1. A method for producing a titanium alloy powder metallurgy article having high resistance to loading and creep at high temperature, comprising the steps of:

(a) providing a preselected quantity of titanium alloy powder;

(b) simultaneously pressing said powder at a pressure in the range of from 15 to 60 ksi and heating said powder to a temperature just below the beta transus temperature of said alloy to promote beta to alpha phase transformation in said alloy; and

(c) slowly cooling said powder under said pressure substantially to room temperature.

4,931,254

NB-TI-AL-HF-CR ALLOY

Melvin R. Jackson, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Dec. 29, 1988, Ser. No. 290,399
Int. Cl.[5] C22C *27/02*
U.S. Cl. 420—426 4 Claims

1. An alloy having high strength at high temperature which comprises an alloy consisting essentially of the following composition in atom percent:

Ingredient:	Nb	Hf	Al	Ti	Cr
Percentages:	54–84	4–10	4–10	5–18	3–8

4,931,255

NICKEL-COBALT BASED ALLOYS

Roger D. Doherty, Wynnewood; Rishi P. Singh, Philadelphia, and John S. Slaney, Greensburg, all of Pa., assignors to SPS Technologies, Inc., Newtown, Pa.

Filed Dec. 2, 1988, Ser. No. 279,375
Int. Cl.[5] C22C *19/00*
U.S. Cl. 420—586 19 Claims

1. A nickel-cobalt alloy comprising the following elements in percent by weight:

Carbon	about 0–0.05
Molybdenum	about 6–11
Iron	about 0–1
Titanium	about 0–6
Chromium	about 15–23
Boron	about 0.005–0.020
Columbium	about 1.1–10
Aluminum	about 1.1–4.0
Cobalt	about 30–60
Nickel	balance

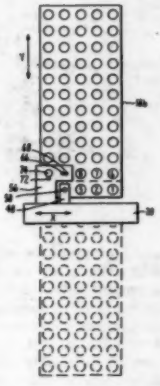
said alloy having an electron vacancy number, N_v, defined by $N_v=0.61Ni+1.71Co+2.66Fe+4.66Cr+5.66Mo$ wherein the respective chemical symbols represent the effective atomic fractions of the respective elements present in the alloy, said value not exceeding the value $N_v=2.82-0.017W_{Fe}$ wherein W_{Fe} is the percent by weight of iron in the alloy.

4,931,256

APPARATUS FOR DILUTION AND MEASUREMENT IN AUTOMATED IMMUNOASSAY TECHNIQUES

Daniel R. Mack, Half Moon Bay; Alfred H. Sturtevant, Palo Alto, and Henry L. Schwartz, Los Gatos, all of Calif., assignors to Sequoia-Turner Corporation, Mountain View, Calif.

Continuation of Ser. No. 888,810, Jul. 22, 1986, abandoned, which is a continuation-in-part of Ser. No. 757,785, Jul. 22, 1985, abandoned. This application Oct. 11, 1988, Ser. No. 217,829
The portion of the term of this patent subsequent to Feb. 7, 2006, has been disclaimed.
Int. Cl.[5] G01N *35/04, 35/06*
U.S. Cl. 422—65 5 Claims



1. In an apparatus for performing immunoassay techniques automatically on a rectangular rack of reaction tubes with the tubes arranged in rows separated by a given distance, an apparatus for adding a reagent and for transferring the resulting solution to an optics module which comprises:

a carriage;

a first probe assembly attached to the carriage;

a diluent/quench probe, which is subtended from the first probe assembly;

a second probe assembly attached to the carriage;

an optics module probe which is subtended from the second probe assembly;

a platform means for selectively positioning a rack of reaction tubes relative to the carriage with the tubes in the rack arranged in rows;

means for providing relative movement between the rack of reaction tubes and said first and second probe assemblies in a first direction parallel to a line through said diluent-/quench probe and said optics probe and in a second direction substantially normal to said first direction;

said first and second probe assemblies arranged relative to each other such that the diluent/quench probe and the optics module probe are separated from each other by a distance equivalent to the given distance between rows of reaction tubes in the rectangular reaction tube rack along the line through said diluent/quench probe and said optics probe; and

means for simultaneously operating said diluent/quench probe of said first probe assembly and said optics module probe of said second probe assembly on tubes in adjacent rows of the rack of tubes whereby the optics module

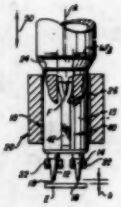
probe can operate in performance of quantitative optical determination of sample in a tube in one row of the rack of tubes while the diluent/quench probe is simultaneously adding a reagent to a tube in the adjacent row of tubes and the reaction time for the reagent is no greater than the time to add reagent to the tubes in sequence between the tube in which the diluent/quench probe is operating and the tube in which the optics probe is operating.

4,931,257

POSITIVELY ENGAGED PIPETTE AND PIPETTE SUPPORT

John A. Quenin, Rochester, and Johannes J. Porte, Webster, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jan. 5, 1989, Ser. No. 293,713
Int. Cl.[5] B01L *3/02, 9/00*
U.S. Cl. 422—100 **12 Claims**



1. In a pipette and a support for said pipette that include a keyway on one and a mating key on the other slidable within said keyway, said support further including stop means against which said pipette is placed to dispense liquid onto a test element from a predetermined distance and location,

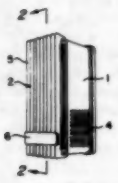
the improvement wherein said key and keyway include holding means for releasably holding said key in said keyway and said pipette within said support and against said stop, to prevent accidental pipette movement that would alter said predetermined distance or location from said test element, said key comprising spring means biased to press against said keyway in two perpendicular directions so as to releasably hold said pipette against said movement by positive engagement.

4,931,258

VANDAL-PROOF DEODORANT CABINET

Arnold Zlotnik; Milton Zlotnik, both of Homestead, and John A. Austin, Gibsonia, all of Pa., assignors to Sureo Products, Inc., Braddock, Pa.

Filed Feb. 23, 1989, Ser. No. 315,344
Int. Cl.[5] A61L *9/04*
U.S. Cl. 422—124 **7 Claims**



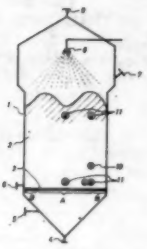
1. A theft-resistant deodorant cabinet comprising: a frame capable of being fixedly mounted to a support surface and capable of containing a deodorant and a deodorant dispersing mechanism, a housing and a front plate attached to the housing, the housing being detachably connected to the frame by a plurality of lock tabs on the housing in one-to-one correspondence with a plurality of lock tabs on the frame, said lock tabs located on the frame forming a plurality of slots for said lock tabs located on the housing, said lock tabs on the frame and the housing being substantially inaccessible from the exterior of the cabinet such that a portion of the frame must be moved to release the lock tabs on the housing from said slots thereby enabling the housing to be detached from the frame.

4,931,259

FLUIDIZED-BED REACTION APPARATUS AND A FLUDIZING BED REACTION PROCESS USING THE SAME

Tsuneo Okamoto, and Yasuo Sakaguchi, both of Iwaki, Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 6, 1988, Ser. No. 280,408
Claims priority, application Japan, Dec. 10, 1987, 62-312475; Nov. 21, 1988, 63-294272
Int. Cl.[5] B01J *8/18;* F27B *15/00*
U.S. Cl. 422—143 **4 Claims**



1. A fluidized-bed reaction apparatus comprising:

a perforated plate located in the lower portion of a fluidized-bed reaction tower for forming a fluidized-bed of particles thereon, the perforated plate having regions with different opening ratios, at least the outer peripheral portion and the geometrical center portion of the perforated plate having a larger opening ratio than an average opening ratio of the perforated plate, the ratio of the area of the portion having the larger opening ratio than the average opening ratio to the area of the portion having an opening ratio not more than the average opening ratio being 1:15 to 1:2, and an average opening ratio of the portion having the larger opening ratio than the average opening ratio being 2 to 8 times larger than an average opening ratio of the portion having the opening ratio not more than the average opening ratio;

an inlet for a heating-fluidized gas located below said perforated plate;

an outlet for the particles located above the perforated plate;

an inlet for the particles receiving the reaction in the fluidized-bed, located in an upper portion of the reaction tower and above the fluidized-bed formed on the perforated plate; and

an outlet for discharging gas located at the top of the reaction tower.

4,931,260

PROCESS AND APPARATUS FOR THE TREATMENT OF GRANULAR SOLID MATERIALS IN A FLUIDIZED LAYER

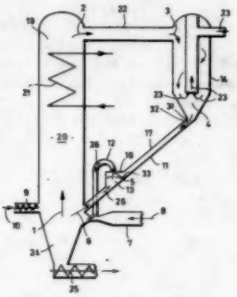
Otto O. Molerus, Hemhofen, and Karl-Ernst Wirth, Happurg, both of Fed. Rep. of Germany, assignors to Rheinische Braunkohlenwerke AG, Cologne, Fed. Rep. of Germany

Filed Jan. 28, 1988, Ser. No. 149,251

Claims priority, application Fed. Rep. of Germany, Jan. 31, 1987, 3702892

Int. Cl.[5] F27B *15/08*

U.S. Cl. 422—147 **14 Claims**



1. A process for the treatment of granular solid material in an apparatus including: a fluidized bed reactor having an upper portion and a lower portion, a means for introducing a granular solid material into said reactor and a means for introducing at least one gas from a location outside of said reactor to a location inside of said reactor, a separator means for separating off particles of solid material from a gas-solids mixture exiting from said reactor, said separator means having a particulate collection portion and a gas collection portion, a connecting means for connecting said reactor upper portion with said separator means, a recycling means comprising a first conduit having an upstream end and a downstream end, a second conduit having an upstream end and a downstream end, and a particulate collection zone, wherein said first conduit upstream end is in open communication with said separator means particulate collection portion, and said first conduit downstream end is in open communication with said recycling means particulate collection zone, and wherein said second conduit upstream end is in open communication with said recycling means particulate collection zone, and said second conduit downstream end is in open communication with said reactor lower portion, a reduced pressure source having a downstream end in open communication with said reactor, and a suction conduit having an upstream end in open communication with said recycling means particulate collection zone, and a downstream end in open communication with said reduced pressure source, said process comprising:

(a) introducing granular solid material into said reactor through said granular solid material introducing means,

(b) treating said granular solid material with at least one gas, under at least atmospheric pressure, in a fluidized layer, wherein at least a portion of said granular solid material leaves said reactor with said at least one gas,

(c) separating off at least a portion of said at least one gas from said granular solid material in said separator means,

(d) returning said separated-off granular solid material to said reactor, by way of said recycling means, wherein said separated-off granular solid material collects within said recycling means particulate collection zone resulting in the formation of an auxiliary bed of granular solid material in said second conduit's upstream end which is at least partially fluidized under the effect of gases flowing upwardly from said reactor lower portion into said recycling means through said second conduit downstream end, and wherein within said apparatus, which includes said reactor, said separator means and said recycling means, there is a pressure drop such that the pressure within said separator means is lower than the pressure in said reactor lower portion in which said separated off and recycled granular solid material passes back into said reactor, and

(e) suctionally removing gases, which flow upwardly from said reactor lower portion into said recycling means second conduit, and which flow downwardly from said separator particulate collection portion into said first conduit, from said recycle means particulate collection zone, through a common exhaust, by creating a pressure level which, at its maximum, is substantially equal to the lowest pressure in said separator means.

4,931,261

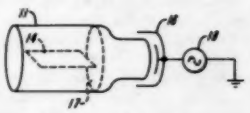
APPARATUS FOR DRY STERILIZATION OF MEDICAL DEVICES AND MATERIALS

Adir Jacob, 23 Juniper La., Framingham, Mass. 01701

Division of Ser. No. 19,134, Feb. 25, 1987, Pat. No. 4,801,427. This application Nov. 22, 1988, Ser. No. 275,203

Int. Cl.[5] A61L *2/14*

U.S. Cl. 422—292 **9 Claims**



6. Apparatus for sterilization of medical devices and materials in a gas plasma comprising,

a gas-confining chamber,

a microwave energy source including a microwave cavity positioned to couple microwave energy into said chamber, and

means for holding said medical devices and materials to be sterilized within said chamber volume, outside of said microwave cavity and at a sufficient distance from the microwave energy source to prevent the direct exposure of said devices and materials to the microwave field.

4,931,262

METHOD OF TREATING H_2S CONTAINING GASES

Hiromi Sonta, and Toshikazu Shiratori, both of Akita, Japan, assignors to Dowa Mining Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 20,757, Mar. 2, 1987, abandoned. This application Dec. 8, 1988, Ser. No. 283,005

Int. Cl.[5] C01B *17/16, 31/20*; C12P *3/00*; C12W *9/64*

U.S. Cl. 423—220 **6 Claims**

1. A method of treating H_2S containing gas to remove the H_2S by absorbing it into a solution of ferric sulfate prepared by oxidizing a ferrous sulfate solution with iron oxidizing bacteria, comprising the steps of

loosely containing a bacteria support supporting the iron-oxidizing bacteria in an oxidation vessel between upper and lower spaced apart porous plates which are horizontally fixed across the vessel so that the vessel is partitioned and the bacteria support with the bacteria is loosely fixed therebetween in the interior of the oxidation vessel; said bacteria support being a member selected from the group consisting of glass-wool, zeolite, bentonite, alumina, pumice stone, PVC raschig rings and Pole rings;

oxidizing the ferrous sulfate solution with the bacteria by supplying the ferrous sulfate solution through the upper porous plate into the interior of the oxidation vessel where the bacteria are supported; and, thereafter oxidizing the ferrous sulfate to ferric sulfate by action of bacteria,

removing the ferric sulfate solution from the oxidation vessel by providing an air-lift pipe having top and bottom ends

which are both open, said air-lift pipe being fixedly supported in the oxidation vessel and penetrating through the porous plates whereby the upper end extends above the upper porous plate and the bottom end extends below the bottom porous plate into a lower portion of said oxidation vessel; and supplying an air stream into the bottom of the air-lift pipe to carry the ferric sulfate solution up the air-lift pipe and out of the upper end; thereafter

collecting ferric sulfate solution and treating the H_2S containing gas therewith to remove the H_2S from the gas and reduce the ferric sulfate in the solution to ferrous sulfate and elemental sulfur;

separating and recovering the elemental sulfur; and

returning the ferrous sulfate solution to the oxidation vessel, to be oxidized to ferric sulfate by the bacteria.

4,931,263

WET-PROCESS STACK GAS PURIFICATION METHOD

Hitoshi Wakui; Nobuo Kiyohara, both of Yokohama; Haruo Nishino, and Osamu Yamamoto, both of Kawasaki, all of Japan, assignors to Chiyoda Chemical Engineering and Construction Co., Ltd., Yokohama, Japan

PCT No. PCT/JP87/00550, § 371 Date Mar. 25, 1988, § 102(e) Date Mar. 25, 1988, PCT Pub. No. WO88/00858, PCT Pub. Date Feb. 11, 1988

PCT Filed Jul. 27, 1987, Ser. No. 187,661

Claims priority, application Japan, Jul. 31, 1986, 61-178752

Int. Cl.[5] **B01D** *45/00, 46/00, 53/00;* **C01B** *17/00*

U.S. Cl. 423—215.5 **2 Claims**

1. A wet-process stack gas purification method by which radioactive dust sulfur oxides and other contaminants contained in stack gas from a radioactive waste incinerator are removed by contacting the stack gas with a scrubbing liquid, comprising the steps of:

scrubbing the stack gas by bubbling the gas out of a stack-gas introduction pipe into a first scrubbing liquid which is selected from the class consisting of water, an alkaline aqueous solution and an alkaline aqueous suspension solution and maintaining a constant liquid level of the first scrubbing liquid by a first liquid level maintaining means; further

purifying the gas scrubbed by the first scrubbing liquid by a counter-current contact with a second scrubbing liquid, in a scrubbing tower, said second scrubbing liquid being selected from the class consisting of water, an alkaline aqueous solution and an alkaline aqueous suspension solution, and maintaining the liquid level of the second scrubbing liquid by a second liquid level maintaining means;

collecting together a portion of the first scrubbing liquid and a portion of the second scrubbing liquid from the respective liquid level maintaining means and cycling the collected liquid portions into the stack-gas introduction pipe for contact with stack gas; and

recycling the remaining portion of the second scrubbing liquid present in the scrubbing tower for counter-current contact with the scrubbed gas in the scrubbing tower.

4,931,264

PROCESS FOR REMOVING SULFUR FROM SULFUR-CONTAINING GASES

Gary T. Rochelle, Austin, Tex., and Wojciech Jozewicz, Chapel Hill, N.C., assignors to Board of Regents, The University of Texas System, Austin, Tex.

Continuation of Ser. No. 928,337, Nov. 7, 1986, Pat. No. 4,804,521. This application Aug. 29, 1988, Ser. No. 238,364

The portion of the term of this patent subsequent to Feb. 14, 2006, has been disclaimed.

Int. Cl.[5] **C01B** *17/00;* **B01J** *8/00*

U.S. Cl. 423—242 **28 Claims**

1. A process for reducing the level of sulfur in a sulfur dioxide-containing gas, comprising the steps of:

(a) preparing an aqueous slurry comprising a calcium alkali together with a calcium-reactive silica or alumina which are present in amounts sufficient to allow for the formation of a sulfur dioxide-absorbing component which includes a calcium silicate or calcium aluminate;

(b) heating the slurry to a temperature between about 40° and about 200° C. to facilitate in the formation of the sulfur dioxide-absorbing component;

(c) contacting the gas with the slurry in a manner sufficient to allow for the absorption of sulfur dioxide by the absorbing component; and

(d) separating the absorbing component in the form of spent solids from the gas.

4,931,265

CONDITIONING PROCESS FOR DUST-CONTAINING WASTE GAS

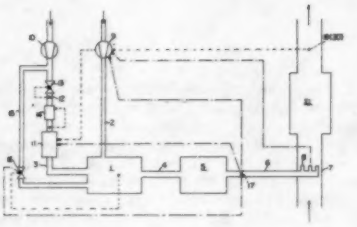
Wilhelm Leussler, Frankfurt, Fed. Rep. of Germany, assignor to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Feb. 3, 1988, Ser. No. 151,780

Claims priority, application Fed. Rep. of Germany, Feb. 4, 1987, 3703266

Int. Cl.[5] **C01B** *17/765*

U.S. Cl. 423—244 **11 Claims**



1. A process for conditioning a dust containing gas stream prior to its introduction into an electrostatic separator comprising:

introducing molten sulfur into a furnace;

introducing combustion air into said furnace at a constant rate in an amount of 4.5 to 5 times that required for stoichiometric combustion of the maximum sulfur rate;

combusting said sulfur in said furnace to produce a gas mixture containing air and SO_2;

exhausting the gas mixture from the furnace;

introducing said gas mixture into a catalytic converter;

converting SO_2 to SO_3 in said catalytic converter;

exhausting an SO_3-containing gas stream from the catalytic converter;

introducing the SO_3-containing gas stream into the dust containing gas through distribution means;

interrupting the sulfur feed when the temperature in the area of the distribution means falls below a critical value, the critical value being determined so as to avoid sulfuric acid corrosion;

measuring a parameter of the gas stream when exhausted from the electrostatic separator and controlling the introduction of sulfur into said furnace in dependence on the measurement;

maintaining a constant amount of thermal energy supplied to the furnace by controlling the sulfur feed rate and by controlling an amount of preheat added in a preheater to the combustion air prior to its introduction into said furnace, the amount of preheat being controlled in dependence on the sulfur feed rate; and

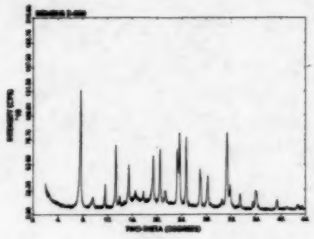
regulating the temperature of combustion air supplied to the preheater.

4,931,266

CRYSTALLINE GALLIOSILICATE WITH THE ERIONITE-TYFE STRUCTURE

Mario L. Occelli, Yorba Linda, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Filed Oct. 22, 1986, Ser. No. 922,272
Int. Cl.[5] C01B *33/20*
U.S. Cl. 423—326 **33 Claims**



1. A crystalline, galliosilicate molecular sieve substantially free of aluminum having the following composition expressed in terms of oxide mole ratios in the anhydrous state:

$Ga_2O_3:xSiO_2:yM_2O:zN_2O:tQ_2O$

where M is an alkali metal, N is an alkali metal other than M, Q is selected from the group consisting of quaternary ammonium cations and protonated amines, x equals 5.5 to 30, y equals 0.1 to 0.9, z equals 0.1 to 0.9, t equals 0.1 to 0.6 and y+z+t equals about 1.0, said crystalline galliosilicate molecular sieve having an X-ray powder diffraction pattern comprising the d-spacings set forth below:

Interplanar d-spacings (Angstroms)	Relative Intensity
11.52 ± 0.50	80–100
9.17 ± 0.30	2–20
6.64 ± 0.20	30–60
5.36 ± 0.20	2–20
4.98 ± 0.15	2–20
4.40 ± 0.15	30–60
4.20 ± 0.15	2–25
3.77 ± 0.15	30–100
3.61 ± 0.10	30–80
2.86 ± 0.10	30–90

20. A process for preparing a crystalline, galliosilicate molecular sieve substantially free of aluminum which comprises:

(a) mixing in the absence of an added source of alumina a source of gallia, a source of silica, a source of one alkali metal, a source of a different alkali metal, a templating agent and water to form a hydrogel substantially free of alumina having the following oxide mole ratios of components:

SiO_2/Ga_2O_3=8 to 30
$(M_2O+N_2O)/Ga_2O_3$=1 to 15
H_2O/Ga_2O_3=80 to 1000
Q_2O/Ga_2O_3=0.1 to 10

wherein M is an alkali metal, N is an alkali metal other than M and Q is selected from the group consisting of quaternary ammonium cations and protonated amines; and

(b) crystallizing said hydrogel to form crystals of said galliosilicate molecular sieve, said crystals having an X-ray powder diffraction pattern comprising the d-spacings set forth below:

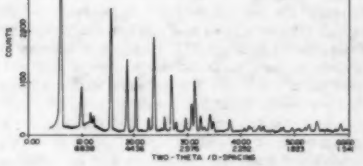
Interplanar d-spacings (Angstroms)	Relative Intensity
11.52 ± 0.50	80–100
9.17 ± 0.30	2–20
6.64 ± 0.20	30–60
5.36 ± 0.20	2–20
4.98 ± 0.15	2–20
4.40 ± 0.15	30–60
4.20 ± 0.15	2–25
3.77 ± 0.15	30–100
3.61 ± 0.10	30–80
2.86 ± 0.10	30–90.

4,931,267

PROCESS FOR PREPARING A HIGH SILICA ZEOLITE HAVING THE FAUJASITE TOPOLOGY, ECR-32

David E. W. Vaughan, Flemington, and Karl G. Strohmaier, Port Murray, both of N.J., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Continuation-in-part of Ser. No. 122,789, Nov. 19, 1987, abandoned. This application May 23, 1989, Ser. No. 355,616
Int. Cl.[5] C01B *33/28*
U.S. Cl. 423—328 **8 Claims**



1. A process for preparing an aluminosilicate having a faujasite structure and a composition, in terms of mole ratios of oxides, in the range:

0.2 to 0.80 T_2O:0.20 to 0.8 $Na_2O:Al_2O_3$:6 to 15 $SiO_2:xH_2O$

wherein T represents an organic ammonium template trapped in supercages of said zeolite and x represents O or an integer from 1 to 20, wherein said process comprises:

(a) preparing a reaction mixture comprising an oxide of sodium, a tetrapropyl or tetra hydroxypropyl or tetrabutyl or tetra hydroxy-butyl organic ammonium salt, water, a source of silica, a source of alumina, and sodium aluminosilicate nucleating seeds, said reaction mixture having a composition, in terms of mole ratios of oxides, within the following ranges:

$(Na,T)_2O:Al_2O_3$	3 to 15
$SiO_2:Al_2O_3$	9 to 36
$H_2O:Al_2O_3$	120 to 500

where T represents the cation of the organic ammonium template, and said seeds being present in an amount to yield 0.1 to 10 mole percent of the total final alumina content in said aluminosilicate;

(b) blending the reaction mixture sufficiently to substantially form a mixture;

(c) maintaining the reaction mixture at between about 90° C.

and 160° C. under autogeneous pressure for a sufficient period of time to form crystals of said aluminosilicate; and
(d) recovering said aluminosilicate crystals.

4,931,268

PRODUCTION OF CHLORINE DIOXIDE

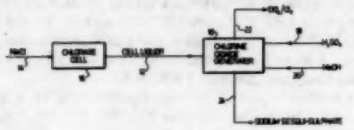
Maurice C. J. Fredette, and Ching-Shi Yang, both of Mississauga, Canada, assignors to Tenneco Canada Inc., Islington, Canada

Continuation of Ser. No. 938,994, Dec. 8, 1986, abandoned, which is a continuation-in-part of Ser. No. 649,923, Sep. 13, 1984, Pat. No. 4,627,969. This application Aug. 28, 1989, Ser. No. 399,398

The portion of the term of this patent subsequent to Aug. 14, 2001, has been disclaimed.

Int. Cl.[5] **C01B** *11/02*

U.S. Cl. 423—479 **13 Claims**



1. A process for the production of chlorine dioxide in a reaction zone, which comprises
feeding sodium chlorate, sodium chloride, methanol and sulphuric acid to a reaction and zone containing and aqueous acid reaction medium having a total acid normality of about 7 to about 12 normal at such individual feed rates as to permit the generation of chlorine dioxide and chlorine at high efficiency from said reaction medium by reaction from about 1 to about 99% by reaction between the fed sodium chlorate, methanol and sulphuric acid and about 99 to about 1% by reaction between the fed sodium chlorate, sodium chloride and sulphuric acid,
maintaining said reaction medium at its boiling point while a subatmospheric pressure is applied to the reaction zone,
removing said generated chlorine dioxide and chlorine from said reaction zone in gaseous admixture with steam, and
precipitating a sodium acid sulphate from the reaction medium once the reaction medium becomes saturated therewith after start-up.

4,931,269

PROCESS FOR THE PURIFICATION AND REHEATING OF EXHAUST GASES

Günter Lailach, and Rudolf Gerken, both of Krefeld, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

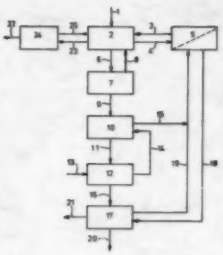
Continuation of Ser. No. 89,889, Aug. 27, 1987, abandoned. This application Oct. 21, 1988, Ser. No. 262,144

Claims priority, application Fed. Rep. of Germany, Sep. 2, 1986, 3629766

Int. Cl.[5] **C01B** *17/98, 17/00*

U.S. Cl. 423—522 **7 Claims**

1. A process for the removal of dust, heavy metals contained in the dust and sulphur dioxide from hot exhaust gases which have a low hydrogen halide content and reheating of the purified exhaust gases, comprising
(a) cooling the hot exhaust gases to temperature below 135° C. by scrubbing said gases in a scrubber with solids-containing 70–80% sulphuric acid and at the same time removing dust solids from the gases;
(b) separating the sulphuric acid containing solids and dissolved metal sulphates from the exhaust gases from (a) and returning said sulphuric acid to the scrubber of step (a), wherein said separation is carried out in mist separators which are laminar separators;
(c) cooling the exhaust gases from (b) to temperatures of 50°–70° C. by scrubbing said gases in a scrubber with 15–50% sulphuric acid;
(d) desulphurizing said exhaust gases from (c) with the formation of pure sulphuric acid from the sulphur dioxide;
(e) reheating the exhaust gases from (d) to temperatures of 70°–90° C. by scrubbing with 50–60% sulphuric acid, the pure sulphuric acid discharged from (c) being at the same time concentrated; and



(f) cooling the solids-containing sulphuric acid from the scrubbing process (a) in heat exchangers by means of pure sulphuric acid from (e), and
(g) taking off the pure sulfuric acid produced during desulphurization of the exhaust gases in step (d) as 50 to 65% sulphuric acid from the scrubber of step (e).

4,931,270

METHOD FOR DETECTING DOPAMINERGIC DISEASES USING FLUORINE-18 RADIOLABELLED D_2 DOPAMINE RECEPTOR LIGANDS

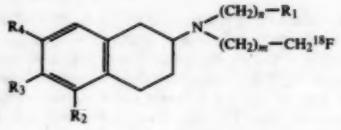
Alan S. Horn, Groningen, Netherlands; Paul A. Jerabek, Long Beach, and James V. Peck, Costa Mesa, both of Calif., assignors to Nelson Research & Development, Irvine, Calif.

Filed Jul. 7, 1988, Ser. No. 216,405

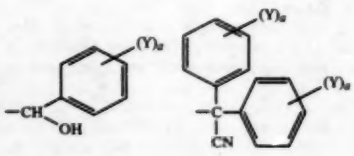
Int. Cl.[5] **A61K** *49/02*

U.S. Cl. 424—1.1 **22 Claims**

1. A method for detecting dopamine D_2 receptor abnormalities in the brain of a mammal, said method comprising (1) administering an amount of a radiolabelled compound sufficient to be detected by a positron emission sensitive brain imaging means, said compound having affinity for said receptors and consisting of an optically active or racemic compound represented by the general formula:



wherein R_1 is selected from the group consisting of organic radicals methyl, substituted or unsubstituted phenyls, pyridyl, hydroxyphenyl,



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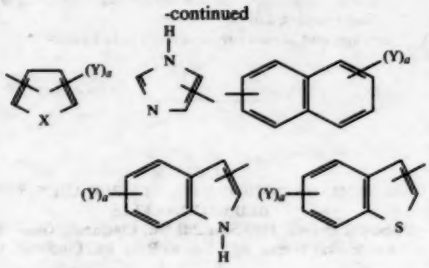


X is oxygen or sulfur, Y is selected from the group consisting of hydroxy, nitro, cyano, azido, amino, acylamino, carboxyamido, trifluoromethyl, sulfate, sulfonamido, halogen, hydrocarbyl and hetero atom-substituted hydrocarbyl radicals, wherein said heteroatoms are selected from the group consisting of halogen, nitrogen, oxygen, sulfur and phosphorus and said hydrocarbyl radicals comprise from 1 to 12 carbon atoms, and a is an integer of from zero to 3,

R_2, R_3 and R_4 are each selected from the group consisting of H and OA, A is H or is selected from the group consisting of hydrocarbyl radicals,

and

R_5 is selected from the group consisting of hydrocarbyl radicals; m is an integer between 0 and 2; n is an integer between 1 and 3; with the provision that at least one of R_2, R_3 and R_4 is H, that at least one of R_2, R_3 and R4 is not H, and that R_2 and R_4 are not both OA, except that when R_1 is meta-hydroxyphenyl, phenyl, or 2-thienyl, the compound is optically active and pharmaceutically acceptable salts thereof.

(2) forming at least one image showing the distribution of the radiolabelled compound within the brain of the human or other mammal using a positron emission-sensitive means for brain imaging; and

(3) determining normality of the concentrations or distribution by comparing the image with an image showing the normal concentrations and distribution of the receptors in the brains of humans or mammals of the same species.

4,931,271

COSMETIC COMPOSTIONS BASED UPON N-HYDROXYBUTYL-CHITOSANS, N-HYDROXYBUTYL-CHITOSANS AS WELL AS PROCESSES FOR THE PRODUCTION THEREOF

Günther Lang, Reinheim; Eugen Konrad, Darmstadt; Harald Wendel, Ober-Ramstadt; Gerhard Maresch, and Hans-Rudi Lenz, both of Darmstadt, all of Fed. Rep. of Germany, assignors to Wella Aktiengesellschaft, Darmstadt, Fed. Rep. of Germany

PCT No. PCT/EP87/00207, § 371 Date Nov. 18, 1987, § 102(e) Date Nov. 18, 1987, PCT Pub. No. WO87/06461, PCT Pub. Date Nov. 5, 1987

PCT Filed Apr. 16, 1987, Ser. No. 134,779

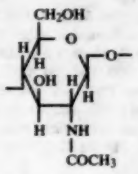
Claims priority, application Fed. Rep. of Germany, Apr. 30, 1986, 3614697

Int. Cl.[5] A61K *7/06, 7/08, 7/13;* C08B *37/08*

U.S. Cl. 424—47 14 Claims

1. Cosmetic composition for treatment of hair or skin comprising as active ingredient an effective amount of a chitosan derivative selected from the group consisting of N-hydroxybutylchitosans, consisting of

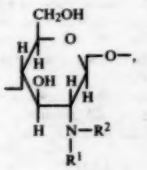
(a) 4 to 40 mole percent monomer units of formula (I)



(I)

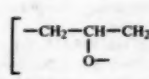
and

(b) 60 to 96 mole percent monomer units of the formula (II)



(II)

wherein R^1 and R^2 are each independently selected from the group consisting of a hydrogen atom and radicals of the formula (III)



(III)

with n being equal to an integer from 1 to 5, provided that R^1 and R^2 are not simultaneously hydrogen in at least 50 percent of the monomer units of formula (II), and soluble salts thereof; and provided in a form selected from the group consisting of an aqueous preparation, alcoholic preparations and aqueous-alcoholic preparations.

4,931,272

TOOTH PASTES, CLEANING AGENT FOR TOOTH PASTES BASED ON DICALCIUM PHOSPHATE-DIHYDRATE, AND PROCESS FOR MAKING SUCH CLEANING AGENT

Franz-Josef Dany; Horst Klassen, both of Erftstadt; Renate Adrian; Hedwig Prell, both of Hürth, and Gerhard Kalteyer, Erftstadt, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Feb. 10, 1988, Ser. No. 154,957

Claims priority, application Fed. Rep. of Germany, Feb. 24, 1987, 3705845

Int. Cl.[5] A61K *7/16;* C01B *25/32*

U.S. Cl. 424—49 7 Claims

1. A tooth paste of dicalcium phosphate dihydrate containing a cleaning agent consisting essentially of dicalcium phosphate dihydrate having an adsorptive power of more than 60 g H_2O/100 g cleaning agent.

4,931,273

ANTICALCULUS ORAL COMPOSITION

Abdul Gaffar, Princeton; Thomas G. Polefka, Somerset; Robert J. Ferlauto, Jr., Edison, and Rosemarie M. Crisafulli, East Windsor, all of N.J., assignors to Colgate-Palmolive Company, Piscataway, N.J.

Continuation of Ser. No. 312,532, Feb. 17, 1989, Pat. No. 4,906,456, which is a continuation of Ser. No. 842,101, Mar. 20, 1986, Pat. No. 4,806,877, which is a continuation-in-part of Ser. No. 775,851, Sep. 13, 1985, Pat. No. 4,627,977. This application Nov. 16, 1989, Ser. No. 437,715

The portion of the term of this patent subsequent to Dec. 9, 2003, has been disclaimed.

Int. Cl.[5] A61K *7/16, 7/18*

U.S. Cl. 424—52 20 Claims

1. In an oral composition containing an orally acceptable aqueous vehicle and, in approximate weight amounts and proportions,

A. a mixture of tetrasodium pyrophosphate and tetrapotassium pyrophosphate;

B. an amount of a fluoride ion source sufficient to supply 25 ppm to 5,000 ppm of fluoride ions; and

C. about 0.05 to about 3% of a synthetic anionic polymeric polycarboxylate having a molecular weight of about 1,000 to about 1,000,000,

the improvement in which the tetrapotassium pyrophosphate is a predominant portion of said mixture.

4,931,274

COMPOSITION FOR THE EFFECTIVE TREATMENT OF SCALP DISEASES THAT DELIVERS MAGNESIUM ADSORBED IN ALUMINA SILICATE CLAYS TO AFFECTED SITES

William A. Barabino, North Reading, and Robert J. Cross, Haverhill, both of Mass., assignors to Physiological Research Associates, North Reading, Mass.

Continuation-in-part of Ser. No. 835,443, Feb. 27, 1986, abandoned, which is a continuation of Ser. No. 606,975, May 4, 1984, abandoned. This application Aug. 17, 1988, Ser. No. 233,033

Int. Cl.[5] A61K *7/06, 7/48, 9/08, 33/12*

U.S. Cl. 424—70 16 Claims

1. A composition for treating dandruff, seborrheic dermatitis and scalp psoriasis comprising an effective amount of a combination of ingredients consisting of about 0.35–0.65 gm of microfine particles of magnesium aluminum silicate having an average particle size of 0.5–3 microns, about 16.5–27.5% by volume of water, about 53.5–89.5% by volume of ethanol and about 4.5–7.5% by volume of a concentrated aqueous solution of sodium chloride based on a 100 ml preparation.

4,931,275

ANTI-TUMOR VACCINES AND THEIR PREPARATION

Meir Shinitzky, and Irun R. Cohen, both of Rehovot, Israel, assignors to Yeda Research & Development Co., Ltd., Rehovot, Israel

Continuation of Ser. No. 803,556, Dec. 2, 1985, abandoned. This application May 24, 1988, Ser. No. 198,691

Int. Cl.[5] C07K *3/02, 3/08, 3/28;* A61K *39/00*

U.S. Cl. 424—88 35 Claims

1. An immunogenic preparation comprising tumor cells treated so as to augment the antigenicity thereof, wherein said treatment to augment the antigenicity of the cells comprises the steps of:

applying hydrostatic pressure to tumor cells dispersed in a buffer for a sufficient time and pressure to cause proteins to be shed from the surface membranes of said cells;

chemically cross-linking said pressure-treated cells and shed proteins by subjecting said pressure-treated cells and shed proteins to a chemical cross-linking agent;

fractionating said buffer containing said cross-linked pressure-treated cells and shed proteins, thereby forming a fraction containing said pressure-treated cross-linked cells and a supernatant fraction containing said cross-linked shed proteins; and

isolating said pressure-treated cross-linked tumor cells.

4,931,276

METHOD FOR INTRODUCING DESIRED AGENTS INTO RED BLOOD CELLS

Robert S. Franco, 1825 Sandcliff Dr., Cincinnati, Ohio 45230, and Murray Weiner, 8915 Spooky Ridge La., Cincinnati, Ohio 45242

Continuation-in-part of Ser. No. 115,241, Oct. 30, 1987, abandoned. This application Mar. 13, 1989, Ser. No. 323,499

Int. Cl.[5] A61K *35/18*

U.S. Cl. 424—533 9 Claims

1. In a method of introducing desired agents into mammalian red blood cells without unacceptable loss of cell contents, comprising the steps of:

providing a supply of packed red blood cells;

suspending and incubating said cells in a solution containing a compound which readily diffuses into and out of said cells, the concentration of said compound being sufficient to cause diffusion thereof into said cells so that the contents of said cells become hypertonic;

rapidly creating a trans-membrane osmotic gradient by diluting said solution containing said hypertonic cells with an essentially isotonic aqueous medium in the presence of at least one desired agent to be introduced, whereby to cause diffusion of water into said cells with consequent swelling and increase in permeability of the outer membranes of said cells; and

maintaining said increase in permeability of said membranes for a period of time sufficient only to permit transport of said at least one agent into said cells and diffusion of said compound out of said cells;

the improvement which comprises providing in said aqueous medium an effective amount of a water soluble polyanion which contains at least two anionic moeities per molecule and which is non-disruptive of the lipid outer membranes of red blood cells, and also providing at least one non-anionic agent or a low concentration of an anionic agent to effect transport of said at least one non-anionic agent or anionic agent into said cells.

4,931,277

CAPSICUM AND POPULAS USEFUL FOR THE TREATMENT OF ALCOHOLIC TOXICOMANIA

Michel Fontaine, 82 rue Joseph Vallot, 74400 Chamonix, France, and Marc Bonneau, 32 rue des Granges, 69005 Lyon, France

PCT No. PCT/FR87/00155, § 371 Date Feb. 19, 1988, § 102(e) Date Feb. 19, 1988, PCT Pub. No. WO87/06834, PCT Pub. Date Nov. 19, 1987

PCT Filed May 12, 1987, Ser. No. 149,227

Claims priority, application France, May 12, 1986, 86 0691

Int. Cl.[5] A61K *35/78*

U.S. Cl. 424—195.1 6 Claims

1. A method for treating alcoholic toxicomania comprising administering to a patient suffering from alcoholic toxicomania an effective amount of a composition containing an effective amount of an extract selected from extracts of the group consisting of the genus Capsicum, the genus Populus, and mixtures thereof.

4,931,278

STORAGE-STABLE PREPARATIONS OF WHEAT VINASSE

Elly Blöst, Duesseldorf, and Ute Welkert, Ratingen, both of Fed. Rep. of Germany, assignors to Allrutan Bio-Produkte GmbH, Duesseldorf, Fed. Rep. of Germany

Filed Apr. 17, 1987, Ser. No. 39,227

Claims priority, application Fed. Rep. of Germany, Apr. 22, 1986, 3613525

Int. Cl.[5] A61K *35/78, 7/00, 7/035, 7/06*

U.S. Cl. 424—195.1 20 Claims

1. Storage-stable preparation containing an ingredient of freshly recovered wheat vinasse. which has been ground to colloidal size and dried under mild conditions.

4,931,279

SUSTAINED RELEASE FORMULATION CONTAINING AN ION-EXCHANGE RESIN

Rajan Bawa, Fairport, and Dominic V. Ruscio, Rochester, both of N.Y., assignors to Bausch & Lomb Incorporated, Rochester, N.Y.

Continuation of Ser. No. 766,605, Aug. 16, 1985, abandoned. This application Jul. 21, 1988, Ser. No. 224,199

Int. Cl.[5] A01N *25/26;* A61J *3/10;* A61K *31/74;* C08F *8/00*

U.S. Cl. 424—427 23 Claims

1. A sustained-release polymeric hydrogel dosage form useful for topical, systemic or transdermal administration of a medicinal agent comprising 50% to 90% w/w of a cross-linked, polymerized hydrophilic polymer, 0.1% to 35% w/w of an ion-exchange resin, which was mixed with the monomer used to form said polymerized hydrophilic monomer prior to polymerization, 0.1% to 20% w/w of a cross-linking agent and said medicinal agent in a therapeutically effective amount.

4,931,280

EDIBLE, BAKED COMPOSITIONS CONTAINING CHOLESTYRAMINE

Thomas G. Wood, Morris Plaines, N.J., and Carol J. Xenides, Fargo, N. Dak., assignors to BASF K & F Corporation, Whippany, N.J.

Filed Jun. 13, 1988, Ser. No. 206,197

Int. Cl.[5] A61K *47/00*

U.S. Cl. 424—439 21 Claims

1. An edible composition suitable for medicinal use comprising:

a baked matrix comprised of water, an edible oil, mono, oligo or polysaccharides, flavoring, cholestyramine which is present in an amount of about 5 to 20 percent by weight relative to the weight of the composition,

said composition being baked for a time period and at a temperature effective for producing a baked composition to provide a therapeutically effective dosage of undecomposed cholestyramine in the baked product.

4,931,281

LAMINAR STRUCTURE FOR ADMINISTERING A CHEMICAL AT A CONTROLLED RELEASE RATE

Kwon H. Kim, Bridgewater; Norman L. Henderson, Gladstone, and Yie W. Chien, North Brunswick, all of N.J., assignors to Hoechst-Roussel Pharmaceuticals Inc., Somerville, N.J.

Continuation of Ser. No. 179,184, Apr. 8, 1988, abandoned, which is a continuation of Ser. No. 59,866, Jun. 9, 1987, which is a continuation of Ser. No. 857,000, Apr. 29, 1986, abandoned. This application Mar. 10, 1989, Ser. No. 322,605

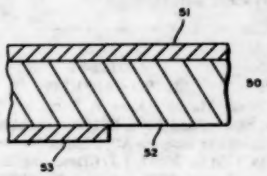
Int. Cl.[5] A61F *13/02*

U.S. Cl. 424—448 11 Claims

1. A laminar structure for administering a medicament which comprises:

a. a boundary layer;

b. a medicament containing layer contiguous to at least a portion of said boundary layer, for maintaining a supply of the medicament, comprising a polymeric resin matrix having dissolved therein a first portion of a mixture of active ingredients of the medicament dissolved therein and a second portion of said mixture dispersed therethrough, said mixture comprising at least two active ingredients of the medicament having different concentration



transport rates through said matrix and present in a ratio to each other to give a controlled release of the medicament selected from the group consisting of tiamenidine and a suitable salt thereof.

4,931,282

PRESSURE-SENSITIVE MEDICAL SEALANT

Robert A. Asmus, Hudson, Wis., and Daniel C. Duan, St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, Minn.

Filed Nov. 25, 1987, Ser. No. 125,377

The portion of the term of this patent subsequent to Jul. 18, 2006, has been disclaimed.

Int. Cl.[5] A61K *9/14, 31/79;* A61L *15/06, 25/00*

U.S. Cl. 424—448 18 Claims

1. A medical sealant composition comprising:

(a) a crosslinked, swellable polymeric matrix formed by a free-radical polymerization of at least one polymerizable monomeric species wherein at least 50 percent by weight of the monomeric component is comprised of one or more N-vinyl lactams, and a crosslinker which is a multiethylenically unsaturated compound with the ethylenic groups being vinyl, allyl, or methallyl groups bonded to nitrogen or oxygen atoms, said N-vinyl lactam monomer being present in a concentration of about 5 to 99.9 percent by weight of the polymeric matrix precursor and said crosslinker being present in a concentration of about 0.02 to 5.0 percent by weight of said N-vinyl lactam monomer;

(b) a plasticizing solution present in a concentration of between about 55 and less than about 95 percent by weight of said medical sealant composition; and

(c) an antimicrobial present in a concentration of between about 0.01 and 10 percent by weight of said medical sealant composition;

which composition is formulated so as to have a T-Peel value of at least about 3 g/cm when measured on low density polyethylene, as described herein.

4,931,283

MENTHOL ENHANCEMENT OF TRANSDERMAL DRUG DELIVERY

Andrew G. Tsuk, Plattsburgh, N.Y., assignor to American Home Products Corp. (Del), New York, N.Y.

Division of Ser. No. 564,654, Dec. 22, 1983, abandoned. This application Mar. 26, 1987, Ser. No. 31,077

Int. Cl.[5] A61L *15/03;* A61F *13/00;* A61K *31/56*

U.S. Cl. 424—449 9 Claims

1. In the transdermal patch delivery art of applying to the skin of a mammal a unit transdermal dosage form, or patch, for transdermal delivery of physiologically active agents other than menthol to mammals comprising an effective amount of a systemically active water soluble or solubilizable drug other than menthol comprised within at least one drug reservoir the improvement which consists of including a percutaneous trans-

fer enhancing amount of from about 4% to about 16% by weight of menthol comprised within a transdermal patch reservoir, matrix, or adhesive for attaching the transdermal patch dosage form to a mammal, wherein the drug other than menthol is selected from the group consisting of propranolol, conjugated estrogens, etodalac, 17-β-estradiol and pharmaceutically acceptable salts thereof.

4,931,284

MICRO-CAPSULES

Bo M. Ekman, Malmö ; Kare V. Larsson, Bjärred; Ake R. Lindahl, Skurup, and Ulf S. E. Rothman, Skanör, all of Sweden, assignors to Biogram AB, Malmo, Sweden

PCT No. PCT/SE86/00451, § 371 Date Jun. 29, 1987, § 102(e) Date Jun. 29, 1987, PCT Pub. No. WO87/02582, PCT Pub. Date May 7, 1987

PCT Filed Oct. 6, 1986, Ser. No. 74,700

Claims priority, application Sweden, Oct. 28, 1985, 8505086

Int. Cl.[5] A61K *37/20, 9/52*

U.S. Cl. 424—450 **19 Claims**

1. A micro-capsule composition consisting essentially of a hydrophobic or lipophilic substance surrounded by surface-active solid crystals of polar lipids, which crystals have a hydrophilic side that is exposed outwards and a hydrophobic side that is turned inwards toward the hydrophobic or lipophilic substance.

4,931,285

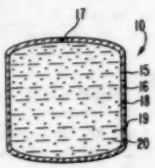
AQUEOUS BASED PHARMACEUTICAL COATING COMPOSITION FOR DOSAGE FORMS

David E. Edgren, El Granada, and Felix Theeuwes, Los Altos, both of Calif., assignors to ALZA Corporation, Palo Alto, Calif.

Filed Apr. 28, 1988, Ser. No. 187,621

Int. Cl.[5] A61K *9/24*

U.S. Cl. 424—473 **2 Claims**



1. An osmotic device comprising:

(a) a wall comprising an annealed subcoat and an overcoat, annealed at about 35° C. to 65° C. for 10 to 72 hours, wherein,

(1) the subcoat comprises a member selected from the group consisting of a cellulose ether, a cellulose ester and a cellulose ester-ether; a plasticizer; and an emulsifier comprising a member selected from the group consisting of nonionic, anionic and cationic emulsifiers; and

(2) the overcoat comprises a member selected from the group consisting of hydroxypropylcellulose, hydroxypropyl methylcellulose, carboxymethylcellulose and methylcellulose; and, optionally, plasticizers; which wall surrounds:

(b) a compartment;

(c) a therapeutically effective amount of drug in the compartment; and,

(d) at least one passageway in the wall connecting the exterior with the interior of the device for delivering the drug over time.

4,931,286

HIGH GLOSS CELLULOSE TABLET COATING

Joseph L. Johnson, Newark, and George W. Skinner, Wilmington, both of Del., assignors to Aqualon Company, Wilmington, Del.

Filed Apr. 19, 1989, Ser. No. 340,757

Int. Cl.[5] A61K *9/36*

U.S. Cl. 424—480 **10 Claims**

1. A high gloss pharmaceutical tablet comprising of at least one active ingredient in a binder matrix as a core with an outermost coating of sodium carboxymethylcellulose having a degree of substitution (D.S.) between 0.2 and 1.4 and a degree of polymerization (D.P.) between 100 and 400 and a polyethylene glycol plasticizer wherein the outermost coating is applied from a water solution by spray coating.

4,931,287

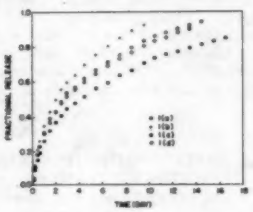
HETEROGENEOUS INTERPENETRATING POLYMER NETWORKS FOR THE CONTROLLED RELEASE OF DRUGS

You H. Bae, Salt Lake City, Utah; Teruo Okano, Urayasu, Japan, and Sung W. Kim, Salt Lake City, Utah, assignors to University of Utah, Salt Lake City, Utah

Filed Jun. 14, 1988, Ser. No. 206,593

Int. Cl.[5] A61K *9/14*

U.S. Cl. 424—484 **13 Claims**



1. A three-dimensional interpenetrating polymer network (IPN) for the substantially continuous release of a drug contained therein, comprising:

(a) a continuous matrix of a first, crosslinked polymeric material;

(b) localized regions of a second, crosslinked polymeric material dispersed throughout said matrix,

wherein one of said polymeric materials is hydrophilic and the other of said materials is hydrophobic; and

(c) a drug either dissolved or dispersed in one or both of said polymeric materials.

4,931,288

CONTROLLED RELEASE COMPOSITIONS (II)

Mostyn Embrey, Oxford, England, and Neil B. Graham, Dunbartonshire, Scotland, assignors to Lloyds Bank PLC, United Kingdom

Continuation of Ser. No. 16,453, Feb. 24, 1987, abandoned, which is a continuation of Ser. No. 815,780, Jan. 3, 1986, abandoned, which is a continuation of Ser. No. 724,949, Apr. 22, 1985, abandoned, which is a continuation of Ser. No. 212,734, Nov. 5, 1980, abandoned. This application Apr. 29, 1988, Ser. No. 188,674

Claims priority, application United Kingdom, Mar. 21, 1979, 7909853

The portion of the term of this patent subsequent to Jan. 16, 2007, has been disclaimed.

Int. Cl.[5] A61K *47/00, 9/00, 9/02*

U.S. Cl. 424—486 **26 Claims**

1. A controlled release composition comprising a prostaglandin and a polymeric carrier therefor comprising residues which are cross-linked through urethane groups, or analogues

thereof, and which comprise polyethylene oxide having a ratio of number average molecular weight to functionality greater than 1,500, the degree of cross-linking being such that there is at least one cross-linking point per ten residues comprising the said polyethylene oxide but such that the proportion of the said polyethylene oxide is greater than 50% by weight of the polymeric carrier which, when prostaglandin-free, is a hydrogel in the dry form at 20° C., contains crystalline regions, and exhibits syneresis in the wet form.

4,931,289

ORAL PHOSPHATE ION ADSORBENT

Takeshi Suzuki, Tokushima, and Mineaki Kobayama, Naruto, both of Japan, assignors to Tomita Pharmaceutical Co., Ltd., Tokushima, Japan

Filed Nov. 15, 1988, Ser. No. 271,329
Claims priority, application Japan, Nov. 16, 1987, 62-290215
Int. Cl.[5] A61K *33/08*
U.S. Cl. 424—690 8 Claims

1. An orally administrable phosphate ion-absorbing composition comprising an effective phosphate ion-adsorbing amount of a beohmite-type aluminum hydroxide which is presented by the formula

$$AlO(OH)\text{-}nH_2O$$

wherein $0 \leqq n < 1$, said aluminum hydroxide containing on the surface thereof about 0.2 to about 1.0 meq of active OH group per gram thereof and having a BET specific surface area of at least about 200 m^2 per gram thereof.

4,931,290

MILK FEVER PROPHYLACTIC TREATMENT AND COMPOSITION

Herbert J. Rebhan, New Richmond, Wis., assignor to Domain, Inc., New Richmond, Wis.

Filed Sep. 23, 1988, Ser. No. 248,994
Int. Cl.[5] A61K *33/08, 33/06, 31/19*
U.S. Cl. 424—692 24 Claims

1. Method for reducing the propensity of a dairy cow to develop severe milk fever upon calving, comprising orally administering to the cow immediately after calving and also at least from about every 8 to 16 hours thereafter a dosage comprising an effective quantity of a water-soluble calcium salt and an affective quantity of complexing agent capable of complexing serum phosphorus to form a water-insoluble phosphorous complex, and providing magnesium or equivalent metal and wherein the first such dosage provides at least about 17 grams of magnesium or its equivalent, said administration continuing for at least three consecutive dosages within about the first 30 hours after calving.

4,931,291

FEEDS FOR LARVAE OF CRUSTACEONS AND SHELLFISH

Eiji Kojima, Kanagawa; Kiyohiro Kitagawa, Chiba, and Akira Seto, Kanagawa, all of Japan, assignors to The Nisshin Oil Mills, Ltd., Tokyo, Japan

Continuation of Ser. No. 67,248, Jun. 15, 1987, abandoned. This application Jul. 12, 1988, Ser. No. 220,387
Claims priority, application Japan, Jun. 24, 1986, 61-147279
The portion of the term of this patent subsequent to Mar. 6, 2007, has been disclaimed.
Int. Cl.[5] A23K *1/10*
U.S. Cl. 426—2 10 Claims

1. A process for breeding larvae of Crustaceans, except for Artemias, and shellfishes which comprises feeding to the larvae unicellular algae having its cell wall disrupted, said unicellular algae being selected from the group consisting of fresh water Chlorella, seawater Chlorella, diatoms and blue-green algae, wherein the cell walls of said unicellular algae are disrupted by any one or more of spray dry treatment, ultrasonic treatment, triturating treatment and cell wall-lysis enzymatic treatment and whereby the growth rate and survival rate of the larvae are substantially improved.

4,931,292

METHOD OF PREPARING IRON(III) PHOSPHATE COMPOUNDS FOR IRON FORTIFICATION OF FOOD PRODUCTS

Lars-Gunnar Torstensson, Kungälv; Per-Arne Dahlqvist, Svanesund, and Malika Benjelloun, Göteborg, all of Sweden, assignors to EKA Nobel AB, Surte, Sweden

PCT No. PCT/SE87/00208, § 371 Date Dec. 22, 1987, § 102(e) Date Dec. 22, 1987, PCT Pub. No. WO87/06433, PCT Pub. Date Nov. 5, 1987
PCT Filed Apr. 22, 1987, Ser. No. 138,379
Claims priority, application Sweden, Apr. 23, 1986, 8601880
Int. Cl.[5] A23L *1/304*
U.S. Cl. 426—2 12 Claims

1. A method for iron fortification of a food product, comprising combining with the food product a complex iron (III) phosphate compound in an amount effective for providing iron fortification, said compound having the formula

$$Z\text{-}\{FeM_{3y-3}(PO_4)_y\}\text{-}XH_2O$$

wherein M is H^+, Na^+, K^+, NH_4^+ or a combination thereof, $1.5 \leqq y \leqq 3.0$, $X \geqq 0$ and Z is a positive integer, the product Z-Y being an integer,

and wherein the food product comprises vegetable material, broth, or a milk-based product.

4,931,293

FOOD ACID DELIVERY SYSTEMS CONTAINING POLYVINYL ACETATE

Subraman R. Cherukuri, Towaco, N.J., and Gul Mansukhani, Staten Island, N.Y., assignors to Warner-Lambert Company, Morris Plains, N.J.

Continuation-in-part of Ser. No. 945,743, Dec. 23, 1986, Pat. No. 4,816,265. This application Nov. 14, 1988, Ser. No. 270,892
Int. Cl.[5] A23G *3/30*
U.S. Cl. 426—5 16 Claims

1. A chewing gum composition having prolonged sourness flavor and juciness duration comprising a gum base and a stable food acid delivery system capable of effecting a controlled release of the acid comprising:

A. At least one particulate food acid selected from the group consisting of citric acid, malic acid, tartaric acid, adipic acid, fumaric acid, succinic acid, ascorbic acid, lactic acid and mixtures thereof; and

B. An emulsifier selected from the group consisting of lecithin, stearates, esters derivatives of stearates, palmitates, ester derivative of palmitates, oleates, ester derivatives of oleates, glycerides, ester derivatives of glycerides, sucrose polyesters, polyglycerol esters, animal waxes, vegetable waxes, synthetic waxes, petroleum wax and mixtures thereof; and

C. Polyvinyl acetate present in amounts of about 30% to about 93% by weight of the total composition of the delivery system and having a molecular weight of about 2,000 to about 14,000.

4,931,294

ENVIRONMENTALLY STABLE CHEWING GUM COMPOSITION CONTAINING XYLITOL

Robert J. Yatka, Orland Park; Mansukh M. Patel, Downers Grove, and Michael A. Reed, Evanston, all of Ill., assignors to Wm. Wrigley Jr. Company, Chicago, Ill.

Filed Mar. 21, 1988, Ser. No. 170,720
Int. Cl.[5] A23G *3/30*
U.S. Cl. 426—3 10 Claims

1. A chewing gum composition which does not significantly

gain or lose moisture when exposed to high or low humidity conditions, consisting essentially of

(a) from about 5 to about 95 percent, by weight of the gum, of gum base;

(b) from about 4.9 to about 94.9 percent, by weight of the gum, of xylitol; and

(c) from about 0.1 to about 10 percent, by weight of the gum, of flavor;

the gum composition containing less than 0.25% of water and ingredients which are more hygroscopic than xylitol at relative humidities less than 80%.

4,931,295

CHEWING GUM CONTAINING HIGH-POTENCY SWEETENER PARTICLES WITH MODIFIED ZEIN COATING

Steven B. Courtright, Evanston, and Kevin F. Barrett, Darien, both of Ill., assignors to Wm. Wrigley Jr. Company, Chicago, Ill.

Filed Dec. 2, 1988, Ser. No. 279,215
Int. Cl.[5] A23G *3/30*
U.S. Cl. 426—5 31 Claims

1. A method for producing chewing gum with a delayed release high-potency sweetener comprising the following steps:

providing a quantity of zein;

providing a quantity of a water soluble modified cellulose compound, wherein the quantity of water soluble modified cellulose compound is between about 5 and about 40 percent by weight of the zein;

providing a solvent for the zein;

mixing the zein, the solvent, and the water soluble modified cellulose compound to produce a modified zein solution, wherein the solution comprises between about 1 and about 50 percent by weight zein;

applying said solution to a high-potency sweetener followed by drying to produce delayed release sweetener particles coated with between about 1 and about 15 percent by weight zein, wherein the zein coating is softened by the inclusion of the water soluble modified cellulose compound; and

adding said delayed release sweetener particles to a chewing gum formulation.

4,931,296

PROCESS FOR PREPARING POTATO GRANULE COATED FRENCH FRIED POTATOES

Sudhakar P. Shanbhag, Pound Ridge, N.Y., and Joseph J. Cousminer, Mercerville, N.J., assignors to Horizons International Foods Inc., Burlington, Mass.

Continuation-in-part of Ser. No. 193,370, May 12, 1988, abandoned. This application Sep. 23, 1988, Ser. No. 248,854
Int. Cl.[5] A23L *1/217*
U.S. Cl. 426—243 59 Claims

1. A process for preparing french fried potatoes suitable for subsequent reheating in a microwave oven to obtain a product having a crisp exterior and a tender interior, comprising

blanching potato strips,

dust-coating said blanched potato strips with potato granules to provide a thin coherent coating of said potato granules on said potato strips, and

finish frying said dust-coated potato strips to a cooked, ready-to-eat condition with said potato strips having a moisture content from about 20 to about 42 percent by weight.

4,931,297

FOOD PRESERVATION PROCESS UTILIZING A BLEND OF ACIDULANTS

Nancy R. Malyniak, Cambridge, and James F. Meagher, Peterborough, both of Canada, assignors to Robin Hood Multifoods, Inc., Rexdale, Canada

Continuation of Ser. No. 13,468, Feb. 11, 1987, abandoned. This application Apr. 11, 1989, Ser. No. 336,214
Int. Cl.[5] A23B *7/10, 4/12*
U.S. Cl. 426—265 6 Claims

1. A process for the preservation of food without imparting a substantial acidic taste wherein said food is one which normally exhibits a dramatic change in its flavour profile upon the addition of conventional acidulants said process comprising reducing the pH of the food to within the pH range of 2.5-6.9 by adding thereto a blend of three acidulants comprising glucono-delta-lactone, adipic acid and citric acid, said glucono-delta-lactone comprising at least 70% said adipic acid less than 30% and said citric acid less than 10% of said blend.

4,931,298

PROCESS FOR PREPARING POTATO GRANULE COATED FRENCH FRIED POTATOES

Sudhakar Shanbhag, Pound Ridge, N.Y., and Joseph J. Cousminer, Mercerville, N.J., assignors to Horizons International Foods, Inc., Burlington, Mass.

Continuation-in-part of Ser. No. 193,370, May 12, 1988, abandoned. This application Sep. 23, 1988, Ser. No. 248,454
Int. Cl.[5] A23L *1/217*
U.S. Cl. 426—296 43 Claims

1. A process for preparing french fried potatoes suitable for subsequent reheating in a deep fat fryer to obtain a product having a crisp exterior and a tender interior, comprising

blanching potato strips,

dust-coating said blanched potato strips with potato granules to provide a thin coating of said potato granules on said potato strips,

finish frying said dust-coated potato strips until said potato strips have a moisture content from about 34 to about 42 percent, and

reheating said finish fried potato strips in a deep fat fryer until said potato strips have a moisture content from about 30 to about 37 percent by weight of said potato strips.

4,931,299

PROCESS FOR PREPARING SALTED-AND-DRIED FISH FOR EATING

Amoy M. Assing-Collier, 62 Delancey Cr., Markham, Ontario, Canada L3P 7E1

PCT No. PCT/GB86/00136, § 371 Date Nov. 14, 1986, § 102(e) Date Nov. 14, 1986, PCT Pub. No. WO86/05360, PCT Pub. Date Sep. 25, 1986
PCT Filed Mar. 12, 1986, Ser. No. 930,263
Claims priority, application United Kingdom, Mar. 19, 1985, 8507120
Int. Cl.[5] A23L *1/325*
U.S. Cl. 426—325 11 Claims

1. A process for preparing salted-and-dried fish; where the fish on which the process is carried out is fish that has been salted and dried by the steps:

(i) of laying open and eviscerating the fish while in a fresh condition;

(ii) of immersing the fish in concentrated brine until the fish has absorbed enough salt to preserve the fish;

(iii) of extracting water from the fish, and of de-hydrating the fish to such an extent that the fish has the hard, bone-dry texture or the almost hard, bone-dry texture of traditional salted-and-dried fish;

where the process comprises the steps:

(a) of re-hydrating fish that has been salted and dried according to the said steps (i) to (iii), being fish that has remained

in the said salted and dried condition for a substantial period, by soaking the fish in fresh water;

(b) of extracting water from the re-hydrated fish until the fish is in the just-damp or almost-dry condition;

(c) of placing the just-damp or almost-dry fish into cans, having ensured, before doing so, that the fish is de-boned and skinned;

(d) of sealing the cans;

(e) and of substantially completely cooking the fish in the can, whereby the fish is ready for eating straight from the can.

4,931,300

ANTIMICROBIAL FOOD COMPOSITION

Woodrow C. Monte, Tempe, Ariz., assignor to Doyle W. Boatwright, Phoenix, Ariz., a part interest

Filed Jan. 9, 1989, Ser. No. 294,642

Int. Cl.[5] A23L *3/34*

U.S. Cl. 426—335 **3 Claims**

1. A food composition for ingestion along the digestive tract of a patient, said food composition consisting of:

(a) from 6% to 28% by weight of water soluble peptide alpha-amino acids, said peptide alpha-amino acids lowering the pH of an aqueous solution of said food composition;

(b) from 4% to 22% by weight of triglycerides of predominantly 6 to 26 carbon atoms in the fatty acid chain;

(c) from 56% to 75% by weight of carbohydrates selected from the group consisting of corn syrup solids, trisaccharides, tetrasaccharides, pentasaccharides, hexasaccharides, dextrose, fructose, sucrose, maltose, oligosaccharides and higher saccharides;

(d) from 0.1% to 6.0% by weight of an emulsifier;

(e) from 0.1% to 6.0% by weight of an edible acid for adjusting the pH of the food composition within the range of 2.0 to 5.5;

(f) from 0.5% to 6.0% by weight of an antimicrobial agent selected from the group consisting of sorbic acid, benzoic acid, sodium benzoate, potassium sorbate, sodium sorbate, and potassium benzoate.

4,931,301

PROCESS FOR MAKING VARIOUSLY SHAPED WAFFLE PRODUCTS, ESPECIALLY HAVING A CONE OR SIMILAR SHAPE, FOR ICECREAMS AND FOODS

Bianchi Giuseppe, Milano, Italy, assignor to Scriba S.p.A., Milan, Italy

Filed Aug. 8, 1988, Ser. No. 240,552

Claims priority, application Italy, Jul. 6, 1988, 212528 A/88

Int. Cl.[5] A21D *15/00*

U.S. Cl. 426—505 **2 Claims**

1. A cyclic process for producing variously shaped waffle products, especially waffle products with a conical or similar shape for ice cream and foods, comprising

introducing fluid batter having a sugar content of more than 20% between thin dies and counterdies having the shape of the products to be obtained, said thin dies and counterdies exhibiting a low thermal inertia when compared to the thermal inertia of said waffle products and a high thermal conductivity and having only the function of shaping said fluid batter;

introducing said thin dies and counterdies and said batter into a hot air environment containing hot air having a substantially uniform temperature;

cooking said batter by uniformly heating said thin dies and counterdies by means of said hot air, said hot air uniformly and mainly delivering through said thin dies and counterdies the heat to cook said batter and form hot waffles between said thin dies and counterdies;

extracting said dies and counterdies from said hot air environment;

cooling the waffles while they are outside of said hot air and still contained between said thin dies and counterdies wherein the amount of heat stored in said waffle is almost all of the waste heat in cooling because said dies have low thickness and high thermal conductivity;

and extracting said waffles from said dies and counterdies when said waffles are at a temperature at which their shape is substantially stable;

in each cycle of the process the spent heat being mainly the heat stored by said waffles.

4,931,302

ASEPTICALLY-PACKAGED, ASPARTAME-CONTAINING PUDDINGS

Richard R. Leshik, Ewing Township, Mercer County; Jill P. Dean, Plainsboro, both of N.J., and Dagmar Krimm, Braunschweig, Fed. Rep. of Germany, assignors to Kraft General Foods, Inc., Glenview, Ill.

Filed Feb. 17, 1989, Ser. No. 312,558

Int. Cl.[5] A23L *1/187*

U.S. Cl. 426—548 **6 Claims**

1. A method for producing aseptically-packaged, ready-to-eat, aspartame-containing pudding comprising:

(a) preparing an aqueous pudding mixture which is less than fully-sweetened and which contains milk or milk derived protein, thickening agents and a water content of up to 90% by weight;

(b) homogenizing, pasteurizing or sterilizing and cooling the mixture of step (a);

(c) preparing an aqueous mixture of an acidic food ingredient and aspartame;

(d) combining the mixture of step (c) through an aseptic filter with the homogenized, pasteurized or sterilized and cooled mixture of step (b), in an amount which produces a pH in the combined mix of from 5.3 to 5.9 and wherein the combined mix has a water content of from 82 to 88% by weight and the ratio of water to milk protein is from 33–50:1;

(e) aseptically packaging the mixture of step (d).

4,931,303

METHOD FOR CONTROLLING THE SURFACE BUBBLING OF FABRICATED SNACK PRODUCTS

David Holm, Idaho Falls; Veldon M. Hix, both of Idaho Falls, Id., and Miles J. Willard, 299 N. Lloyd Cir., Idaho Falls, Id. 83402, assignors to Miles J. Willard, Idaho Falls, Id.

Filed Jan. 15, 1988, Ser. No. 144,880

Int. Cl.[5] A21D *13/00*; A23B *4/04*

U.S. Cl. 426—549 **18 Claims**

1. A process for preparing fried chip products, said process inducing a controlled level of bubbling on the exterior of said chip products, said process comprising:

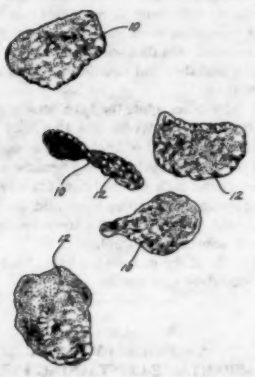
a. preparing a sheeted dough having from about 30% to about 55% moisture;

b. forming said dough into a dough sheet having upper and lower dough surface portions and an inner dough portion, said dough sheet having a thickness of from about 0.5 mm to about 1.5 mm, and dividing said dough sheet into individual dough preforms;

c. treating the dough preforms immediately prior to frying

to reduce the total moisture to between about 30% and 45% and the moisture level of the upper and lower dough surface portions to a moisture content substantially lower than the moisture content of the inner dough portion; and

d. frying the dough preforms without substantial moisture



equilibration between the upper and lower dough surface portions and the inner dough portion, such that the steam produced within the inner dough portion during frying is retained within said inner dough portion and upon expansion creates bubbles on the upper and lower dough surface portions.

4,931,304

FLAVOR ABSORBED NUTS PROCESS

Shri C. Sharma, Mendham, N.J., assignor to Warner-Lambert Company, Morris Plains, N.J.

Continuation-in-part of Ser. No. 794,251, Oct. 30, 1985, abandoned, which is a continuation-in-part of Ser. No. 570,474, Jan. 13, 1984, abandoned. This application Jan. 27, 1986, Ser. No. 822,431

Int. Cl.[5] A23L *1/36*

U.S. Cl. 426—632 **17 Claims**

1. A process for flavoring edible nuts, seeds and beans with a volatile flavoring agent which comprises:

(a) roasting the nuts, seeds and beans at about 138° C. to about 200° C. for about 4 minutes to about 12 minutes:

(b) partially cooling the nuts, seeds and beans to a temperature of about 56° C. to about 92° C.;

(c) applying a volatile flavoring agent to the partially cooled nuts, seeds and beans and blending the nuts, seeds and beans until the volatile flavoring agent is absorbed by the nuts, seeds and beans while maintaining the temperature of the nuts, seeds and beans in the range of about 56° C. to about 92° C.;

(d) cooling the nuts, seeds and beans to room temperature; and

(e) recovering the flavored nuts, seeds and beans.

4,931,305

MIXTURE OF SALTS AND USES OF THE MIXTURE

Heikki Karppanen, and Pirjo L. Karppanen, both of Helsinki, Finland, assignors to Pharmaconsult Oy, Finland

Continuation of Ser. No. 35,239, Apr. 6, 1987, abandoned, which is a continuation of Ser. No. 760,741, Jul. 22, 1985, abandoned. This application Nov. 16, 1988, Ser. No. 273,186

Claims priority, application Finland, Nov. 24, 1983, 834309

Int. Cl.[5] A23L *1/237*

U.S. Cl. 426—649 **5 Claims**

1. A salt substitute composition consisting essentially of magnesium sulfate, potassium chloride, sodium chloride and acidic amino acid or acidic acid salt thereof, the ratio of the respective ingredients on a molar bases being 3:26:69:to 4:21:66:9.

4,931,306

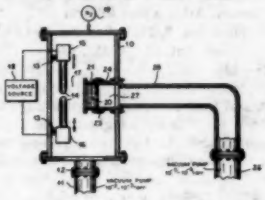
HIGH PENETRATION DEPOSITION PROCESS AND APPARATUS

Eduard Pinkhasov, Eastchester, N.Y., assignor to Vapor Technologies Inc., Mt. Vernon, N.Y.

Filed Nov. 25, 1988, Ser. No. 276,068

Int. Cl.[5] B05B *3/06*

U.S. Cl. 427—37 **14 Claims**



1. A method of producing a high-density structure, comprising the steps of:

(a) disposing a body of a porous material between two chambers;

(b) evacuating one of said chambers to a subatmospheric pressure adapted to sustain vapor formation by an electrical discharge;

(c) effecting an electrical discharge in said one of said chambers to vaporize a substance therein; and

(d) evacuating the other of said chambers to a lower subatmospheric pressure and a higher vacuum than that in said one of said chambers and thereby inducing said substance to penetrate into said body in a vapor state and deposit in interstices thereof in the form of a deposited material.

4,931,307

METHOD OF CORRECTING DEFECT OF PATTERNED ARTICLE

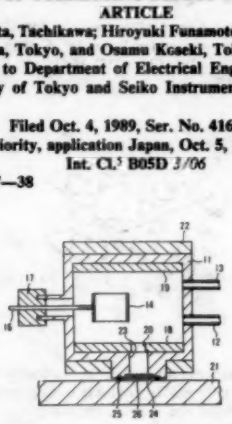
Toshio Sugita, Tachikawa; Hiroyuki Funamoto, Tokyo; Kazuyoshi Furuta, Tokyo, and Osamu Koseki, Tokyo, all of Japan, assignors to Department of Electrical Engineering, Science University of Tokyo and Seiko Instruments, Inc., both of, Japan

Filed Oct. 4, 1989, Ser. No. 416,879

Claims priority, application Japan, Oct. 5, 1988, 63-249780

Int. Cl.[5] B05D *3/06*

U.S. Cl. 427—38 **2 Claims**



1. A method of correcting a missing defect of a patterned film formed on an article, comprising the steps of:

providing an operative vacuum chamber having a pin hole;

positioning an area of the missing defect outside the vacuum chamber in registration with the pin hole;
operating the vacuum chamber to cause therein cold cathode discharging to generate particles; and
directing a stream of the particles through the pin hole onto the area of the missing defect to deposit thereon a corrective film of the particles.

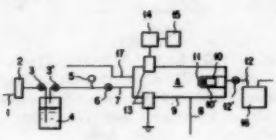
2. A method of correcting a remaining defect of a patterned film formed on an article, comprising the steps of:
providing an operative vacuum chamber having a pin hole;
positioning an area of the remaining defect outside the vacuum chamber in registration with the pin hole;
operating the vacuum chamber to cause therein cold cathode discharging to generate particles and gas ions; and
directing a stream of the particles and gas ions through the pin hole onto the area of the remaining defect to thereby remove therefrom a left patterned film to correct the remaining defect.

4,931,308

PROCESS FOR THE PREPARATION OF FUNCTIONAL TIN OXIDE THIN FILMS

Isamu Shimizu, and Masahiro Fushimi, both of Yokohama, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 2, 1987, Ser. No. 33,190
Claims priority, application Japan, Apr. 4, 1986, 61-76621; Apr. 4, 1986, 61-76622; May 21, 1986, 61-114692; May 28, 1986, 61-120975
Int. Cl.[5] B05D 3/06
U.S. Cl. 427—39 **9 Claims**



1. A process for preparing a functional tin oxide thin film on a substrate in a substantially enclosed reaction vacuum chamber, comprising:
(i) forming a reduced active species by feeding a tin-containing raw material gas (A) including a rare gas as a carrier and a reducing gas (B) into a first region of said reaction vacuum chamber, allowing both gases (A) and (B) to mix, and applying discharge energy to form said reduced active species;
(ii) transporting said reduced active species into a second region of said reaction vacuum chamber in which said substrate is positioned and maintained at a temperature up to 230° C. sufficient to provide said tin oxide film having uniformity of thickness and homogeneity of composition; and
(iii) introducing an oxidizing gas (C) into said second region to mix and chemically react with said reduced active species and effect the formation of said tin oxide film.

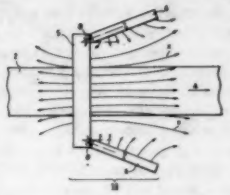
4,931,309

METHOD AND APPARATUS FOR PRODUCING MAGNETIC RECORDING MEDIUM

Kazunori Komatsu, and Toshikazu Uetake, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jan. 18, 1989, Ser. No. 299,274
Claims priority, application Japan, Jan. 18, 1988, 63-7047
Int. Cl.[5] B05D 3/14
U.S. Cl. 427—48 **10 Claims**

1. A method for producing a magnetic recording medium comprising the steps of: coating a continuously running elongated support with a magnetic liquid so as to form a magnetic layer on said support; applying a main magnetic field to said magnetic layer so that said magnetic layer is oriented at least before said magnetic layer has been dried and hardened; and applying a correcting magnetic field in a region of a part of said main magnetic field and in which said main magnetic field



spreads in a transverse direction of said support toward the downstream side with respect to the running direction of said support to thereby reduce the spread of said main magnetic field and linearize said main magnetic field across a width of said support.

4,931,310

PROCESS FOR TREATING THE SURFACE OF POLYIMIDES TO IMPROVE PROPERTIES TO RECEIVE METAL LAYER

Morris Anschel, Binghamton, and Walter P. Pawlowski, Endicott, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 25, 1988, Ser. No. 275,825
Int. Cl.[5] B05D 3/06
U.S. Cl. 427—55 **17 Claims**

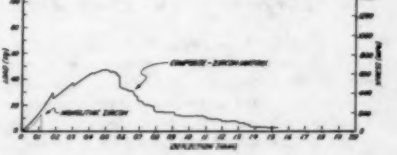
1. A process for improving the surface properties of a polyimide article for the reception of a metal film and wherein said polyimide article has substantial amounts of transimide present, said process comprising, in the order listed, the steps of:
treating the surface of the article with a base to convert the surface layer of the polyimide and transimide to polyamic acid salts,
thereafter treating the surface with an acid to convert the polyamic acid salts to polyamic acid,
and thereafter curing the surface layer of polyamic acid sufficiently rapidly to form a polyimide surface substantially free to transimide,
whereby the surface properties of the article for the reception of a metal layer are improved.

4,931,311

METHOD OF OBTAINING A FILAMENT-CONTAINING COMPOSITE WITH A BORON NITRIDE COATED MATRIX

Raj N. Singh, Schenectady, and Achuta R. Gaddipati, Scotia, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Dec. 21, 1987, Ser. No. 135,858
Int. Cl.[5] B05D 3/06
U.S. Cl. 427—56.1 **8 Claims**



1. A process for producing a composite containing a layer of

boron nitride coated filaments embedded in a ceramic matrix which comprises the following steps:

(a) providing matrix-forming ceramic material;

(b) admixing said matrix-forming material with an organic binding material;

(c) forming the resulting mixture into a tape;

(d) depositing a coating of boron nitride on a filament leaving no significant portion thereof exposed, said filament having a diameter of at least about 50 microns and a length at least about 10 times its diameter;

(e) forming a plurality of said boron nitride coated filaments into a layer wherein said coated filaments are spaced from each other and at least substantially parallel to each other;

(f) disposing said layer of coated filaments intermediate the faces of two of said tapes forming a layered structure;

(g) laminating the layered structure to form a laminated structure;

(h) heating said laminated structure to remove said organic binding material leaving no significant deleterious residue; and

(i) hot pressing the resulting porous structure at a sufficient temperature under a sufficient pressure for a sufficient period of time to consolidate said structure to produce said composite having a porosity of less than about 5% by volume, said composite containing no significant reaction product of said coated filaments and said matrix, said matrix having a thermal expansion coefficient which ranges from lower than that of said coated filaments to less than about 15% higher than that of said coated filaments, at least about 10% by volume of said composite being comprised of spaced boron nitride coated filaments.

4,931,312

SOL-GEL PROCESS FOR PRODUCING LIMINESCENT THIN FILM, AND FILM SO PRODUCED AND DEVICES UTILIZING SAME

Dagobert M. de Leeuw, White Plains; Walter K. Zwicker, Scarborough, and Rameshwar N. Bhargava, Ossining, all of N.Y., assignors to North American Philips Corporation, New York, N.Y.

Continuation of Ser. No. 812,219, Feb. 10, 1986, abandoned. This application Oct. 20, 1988, Ser. No. 262,244

Int. Cl.[5] B05D *5/06*

U.S. Cl. 427—64 **2 Claims**

1. A sol-gel process for producing a thin film of luminescent material on a substrate, the process comprising:

(a) forming a gellable liquid by first dissolving at least one metal alkoxide precursor of at least one constituent of the luminescent material in a water-miscible non-polar solvent, and adding sufficient water to at least partially hydrolize the alkoxide without gelling the solution;

(b) applying the gellable liquid to a substrate to form a thin film;

(c) gelling the film by allowing the film to air dry; and

(d) heating the gelled film to decompose precursors into non-volatile constituents and volatile components, to remove the volatile components, and to convert the non-volatile, non-luminescent constituents into a luminescent material, the heating being carried out in an atmosphere containing a gaseous reactant in order to promote incorporation of the reactant which is ion forming into the luminescent material.

4,931,313

METHOD OF FORMING A PROTECTIVE FILM FOR AN OPTICAL RECORDING MEDIUM

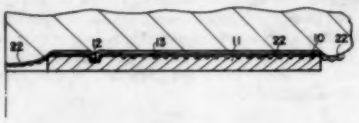
Nobuyuki Arakawa, Kanagawa; Hirotsugu Suzuki, and Tokihiro Nishihara, both of Chiba, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Aug. 31, 1988, Ser. No. 238,524

Claims priority, application Japan, Sep. 3, 1987, 62-221082

Int. Cl.[5] B05D *5/00, 1/28*

U.S. Cl. 427—164 **5 Claims**



1. A method of forming a protected optical recording medium having a recording layer on a substrate comprising steps of:

applying a protective film forming ink having a viscosity in a range of 0.9 to 100 poise to a pad having a Shore A hardness in a range of 8 to 30; and

pressing the pad against the recording layer on the substrate to transfer the protective film forming ink to the recording layer in a protective film that extends over the peripheral edges of the recording layer.

4,931,314

METHOD FOR PREVENTING HARDENED CEMENTITIOUS MATERIAL FROM DETERIORATING

Makoto Takakura; Takahiro Hori; Yuriko Sakaguchi, and Yuji Nakamura, all of Funabashi, Japan, assignors to Nissan Chemical Industries Ltd., Tokyo, Japan

Filed Oct. 13, 1988, Ser. No. 256,941

Claims priority, application Japan, Oct. 15, 1987, 62-258429

Int. Cl.[5] B32B *35/00*

U.S. Cl. 427—140 **3 Claims**

1. A method for preventing a hardened cementitious material from deteriorating comprising the steps of:

(a) applying a cement paste, mortar or concrete composition containing 1–25 weight % of lithium nitrite relative to the cement content, so as to cover the surface of a hardened cementitious material, and

(b) allowing said composition to harden.

4,931,315

WIDE ANGLE OPTICAL FILTERS

Charles E. Mellor, Salem, Mass., assignor to GTE Products Corporation, Danvers, Mass.

Division of Ser. No. 178,790, Mar. 29, 1988, Pat. No. 4,854,670, which is a continuation-in-part of Ser. No. 943,274, Dec. 17, 1986, abandoned. This application Sep. 23, 1988, Ser. No. 248,675

Int. Cl.[5] B05D *5/06*

U.S. Cl. 427—167 **5 Claims**

1. A method of fabricating a thin-film optical interference filter including a substrate and a plurality of layers applied seriatim on said substrate, said plurality of layers including first and second adjacent layers of the same coating material, said method comprising the steps of:

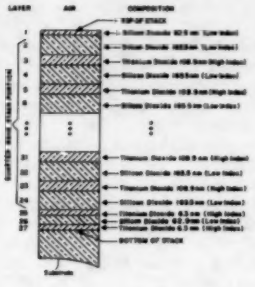
(a) adjusting the temperature of said substrate and any previously applied layers on said substrate to a first deposition temperature;

(b) applying said first layer of a first coating material on the last appllied layer on said substrate at said first deposition temperature, said first layer having a first index of refraction;

(c) changing the temperature of said substrate and any previ-

ously applied layers on said substrate, said previously applied layers now including said first layer, to a second deposition temperature; and

(d) applying said second layer of said first coating material on said first layer at said second deposition temperature,



said second layer having a second index of refraction, said second index of refraction being unequal to said first index of refraction;

(e) whereby an optical boundary is formed between said first and second layers of said same coating material.

4,931,316

PREPARATION OF INTERSTITIAL TITANIUM CERAMIC FIBERS

Robert E. Johnson, Hoboken, N.J., assignor to Hoechst Celanese Corp., Somerville, N.J.

Filed Sep. 6, 1988, Ser. No. 240,645

Int. Cl.[5] D06M *13/50*; D01F *9/22*

U.S. Cl. 427—227 **20 Claims**

1. A process for preparing titanium-containing preceramic fibers comprising: impregnating a carbon-forming polymeric fiber with a liquid titanium composition comprising up to 20 wt. % of a solvent and a titanium tetraalkoxide wherein each alkoxy group contains 2 to 4 carbon atoms and, precipitating the titanium compound in the fiber as titanium dioxide.

4,931,317

COMPOSITION AND PROCESS FOR THE FORMATION OF A BLACK COATING ON SURFACES OF MATERIALS

Shizuo Shima, and Soei Koizumi, both of Kanagawa, Japan, assignors to Nihon Parkerizing Co., Ltd., Tokyo, Japan

Filed Mar. 30, 1989, Ser. No. 330,557

Claims priority, application Japan, Mar. 30, 1988, 63-74671

Int. Cl.[5] B05D *3/02*

U.S. Cl. 427—385.5 **20 Claims**

10. A process for forming a black surface on a solid substrate, comprising the steps of:

(A) coating the substrate surface with a film of a fluid composition consisting essentially of:

(1) an amount of chromium trioxide to give a stoichiometric equivalent of from about 30 to about 150 g/L of Cr^{6+};

(2) from about 20 to about 100 g/L of Cr^{3+};

(3) a component to provide a stoichiometrically equivalent amount of from about 0.5 to about 50 g/L of total ferrous metal ions;

(4) from about 5 to about 200 g/L of dispersed or dissolved organic film forming polymer; and

(5) the balance water,

wherein the weight ratio of to Cr^{+6} to Cr^{+3} is between about 5 and about 1; and

(B) heating the coated substrate formed in step (A) to a sufficient temperature for a sufficient time to form an adherent uniformly black coating on the substrate.

20. A process according to claim 10, wherein the substrate surface coated is selected from the group consisting of ferrous metals and their alloys, aluminum and its alloys, zinc and its alloys, copper and its alloys, platings of these metals and alloys, ceramics, and glasses.

4,931,318

SILICA AS BLOCKING AGENT FOR FIBERGLASS SIZING

John A. Romberger, Oak Park; Robert D. Jones, and Richard P. Carr, both of Naperville, all of Ill., assignors to Nalco Chemical Company, Naperville, Ill.

Filed Sep. 23, 1988, Ser. No. 248,221

Int. Cl.[5] B05D *3/02*

U.S. Cl. 427—397.7 **3 Claims**

1. A method of preventing the interaction of cationic softeners coated upon the surfaces of glass fibers with anionic polymers contained in aqueous baths used in forming the glass fibers into mats which comprises treating the fiber with at least 1 part per million, of colloidal silica, expressed as SiO_2, in the form of an aqueous colloidal silica sol.

4,931,319

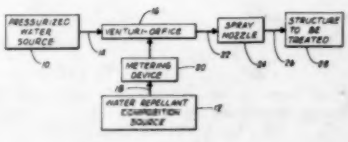
METHOD FOR APPLYING A WATER REPELLANT COMPOSITION WITH A WATER CARRIER

Mike F. Stout, Oklahoma City, and Dean Brunken, Edmond, both of Okla., assignors to Advanced Chemical Technologies Company, Oklahoma City, Okla.

Filed Jul. 1, 1988, Ser. No. 214,174

Int. Cl.[5] B05D *1/02*

U.S. Cl. 427—421 **38 Claims**



1. A method for treating siliceous and or carbon central structures at a site with a water repellant composition comprising the steps of:

mixing an effective amount of water repellant composition with water to obtain a dispersion of water and water repellant composition;

applying the dispersion of water repellant composition and water to the structure in a continuous process at the site immediately within about 5 seconds after the water repellant composition and the water are mixed; and wherein the water repellant composition comprises a silane or siloxane or combinations thereof and, wherein the silane has the general formula:

$$R_m - Si - X_{4-m}$$

wherein

m is 0 or 1 or 2 or 3;

X is a halogen, hydroxyl, R or R_1;

R is an alkyl group containing from 1 to about 30 carbon atoms, hydrogen, an alkoxy group, an alkenyl group, an aryl group, a cycloalkyl group, a cycloalkenyl group, an arylalkyl group, or an arylalkenyl group, and R_1 being an alkyl group containing from 1 to about 8 carbon atoms, a hydroxyalkyl group, or an alkoxyalkyl group; and wherein the siloxane has the general formula:

wherein R_2 is the same or different moiety of an alkyl containing from 1 to about 30 carbon atoms, an alkenyl containing up to about 8 carbon atoms, an aryl or a cycloalkyl, cycloalkenyl, arylalky or arylalkenyl wherein the cyclo substituent contains from about 4 to about 8 carbon atoms, the alkyl substituent contains from 1 to about 8 carbon atoms, the alkenyl substituent contains up to about 8 carbon atoms, and y is an integer of from 2 to about 100; and wherein W is a halogen, hydroxyl, alkyl, aryl or alkoxy.

5. The method of claim 1 wherein the step of mixing the water repellant composition with the water is defined further to include the steps of:

passing water under pressure through a venturi-orfice;

passing the water repellant composition into the water in the venturi-orfice for mixing with the water to form the dispersion of water and water repellant composition; and

passing the dispersion of water repellant composition and water from the venturi-orfice to the structure to be treated.

6. The method of claim 5 defined further to include the step of:

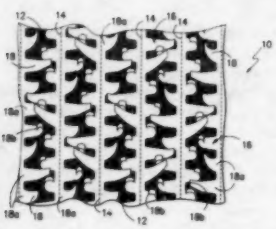
passing the dispersion of water and water repellant composition through a spray nozzle, and the dispersion of water and water repellant composition from the spray nozzle being passed onto the structure to be treated.

4,931,320

CAMOUFLAGE CONSTRUCTION

Robert R. Leonard, Spartanburg, S.C., assignor to Milliken Research Corporation, Spartanburg, S.C.

Filed Jul. 7, 1989, Ser. No. 377,057
Int. Cl.[5] F41H 3/00
U.S. Cl. 428—17 10 Claims



1. A lightweight composite camouflage construction comprising an open mesh net substrate and a continuous sheet overlying the substrate and bonded to the substrate along at least three spaced lines of attachment, said sheet being cut on opposite sides of said lines of attachment to form a plurality of lobes, each lobe having a base portion attached to the substrate by one of said lines of attachment and an outer end portion free from the substrate to simulate the appearance of natural objects of a terrain, said sheet being color patterned in desired coloration to conform to the terrain in which the camouflage structure is used.

4,931,321

FROZEN FOOD COMPOSITION

John Harra, 155 W. 81st St., Apt. 31, New York, N.Y. 10024

Filed Mar. 3, 1987, Ser. No. 20,969
Int. Cl.[5] A23G 9/04
U.S. Cl. 426—615 15 Claims

1. A process of making a frozen rhubarb composition, comprising:

liquefying rhubarb which comprises heating said rhubarb;

mixing a flavoring agent with the liquefied rhubarb, the proportion of rhubarb to flavoring agent being such that the resulting frozen rhubarb is cohesive and dripless; and

freezing the liquefied rhubarb.

14. A process of preparing a frozen rhubarb composition, comprising the steps of:

cutting rhubarb leafstalk into pieces;

liquefying the rhubarb leafstalk pieces by cooking them;

further liquefying the cooked rhubarb in a blending apparatus;

adding a flavoring agent comprising raw or cooked fruit to the liquefied rhubarb; and

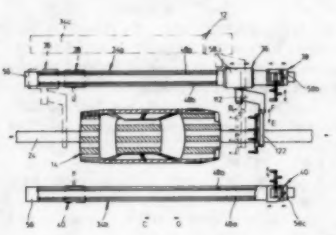
dynamically freezing by constant stirring of the mixture of liquefied rhubarb and flavoring agent.

4,931,322

METHOD AND APPARATUS FOR PAINTING OBJECT

Tohru Yamamoto; Tadashi Takeo; Kiyohiro Ichinose; Syogo Ozawa; Kenji Fujii; Saburo Fujii; Mashayuki Enomoto; Ichiro Ishibashi, and Junichi Murayama, all of Sayama, Japan, assignors to Honda Giken Kogyo Kabushiki

Filed Apr. 1, 1987, Ser. No. 32,712
Claims priority, application Japan, Apr. 1, 1986, 61-76086; Apr. 1, 1986, 61-76087; Apr. 1, 1986, 61-76088; Apr. 1, 1986, 61-49374[U]; Apr. 1, 1986, 61-49375[U]; Apr. 1, 1986, 61-49376[U]; Apr. 1, 1986, 61-49377[U]; Dec. 22, 1986, 61-305795; Feb. 3, 1987, 62-13776[U]
Int. Cl.[5] B05D 1/02
U.S. Cl. 427—421 5 Claims



1. A method of painting an object having opposite side surfaces and an upper surface, comprising the steps of:

positioning said body to remain at rest in a painting position;

applying paint sprays ejected from a plurality of paint spraying means mounted on a plurality of arms to said opposite side surfaces and upper surface, wherein a plurality of paint spraying means are mounted on each said arm such that the paint sprays from each of said paint spraying means do not mutually interfere with each other; and

moving said arms independently in mutually positionally displaced relation with respect to said body at rest to allow the paint spray from the paint spraying means to be coated on the surfaces of the object substantially without mutual interference of the paint sprays.

4,931,323

THICK FILM COPPER CONDUCTOR PATTERNING BY LASER

James Manitt, Garland, Tex., and Scott Hull, San Gabriel, Calif., assignors to Texas Instruments Incorporated, Dallas, Tex.

Division of Ser. No. 130,903, Dec. 10, 1987. This application Oct. 6, 1988, Ser. No. 256,148
Int. Cl.[5] B05D 1/12, 7/04
U.S. Cl. 427—53.1 20 Claims

1. A method of forming an electrical conductor on a device surface comprising the steps of:

(a) providing an unfired electrically conductive material;

forming a layer of said unfired electrically conductive material over the device surface;

(b) moving a beam of coherent radiant energy along a predetermined path on said layer of unfired electrically conductive material to fire the portions of said layer along said predetermined path to define the configuration of said electrical conductor;

(c) removing the remainder of said electrically conductive material which remains unfired; and

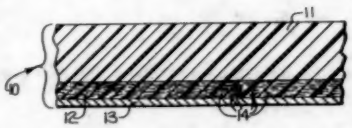
(d) applying sufficient heat to said surface and said fired electrically conductive material in an inert atmosphere to complete the formation of said electrical conductor and provide adherence of said electrical conductor to said device surface along said predetermined path.

4,931,324

DECORATIVE SHEET MATERIAL SIMULATING THE APPEARANCE OF A BASE COAT/CLEAR COAT PAINT FINISH

Thomas M. Ellison, and Robert A. Winton, both of Charlotte, N.C., assignors to Rexham Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 924,299, Oct. 28, 1986, Pat. No. 4,810,540. This application Sep. 8, 1988, Ser. No. 241,856
Int. Cl.[5] B60R 13/04
U.S. Cl. 428—31 19 Claims



1. A flexible decorative sheet material suitable for use in surfacing panels, such as automobile body panels, said sheet material being characterized by having the appearance of a glossy, base coat/clear coat automotive paint finish, and comprising a flexible outer layer having a smooth, glossy outer surface with a distinctness of image value of 65 percent or greater and formed of a flexible, optically clear weatherable polymer, and a pigmented coating adhered to the opposite surface of said outer layer and visible through the clear outer layer.

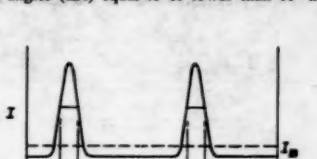
4,931,325

MANUFACTURED ARTICLES BASED ON ISOTACTIC POLYPROPYLENE HAVING A HIGHLY ORIENTED STRUCTURE

Paolo Corradini; Claudio De Rosa; Gaetano Guerra; Luigi Nicolais; Vittorio Petraccone, all of Naples, Italy, and Giancarlo Attalla, Rijswijk, Netherlands, assignors to Montedison S.p.A., Milan, Italy

Filed Dec. 21, 1987, Ser. No. 135,244
Claims priority, application Italy, Dec. 30, 1986, 22885 A/86
Int. Cl.[5] B29D 22/00
U.S. Cl. 428—35.7 8 Claims

1. Multilayer thermoformed articles in the form of plates, sheets and tubes, consisting essentially of alternating superimposed layers made of uniaxially oriented polypropylene films and unoriented polypropylene films melt bonded to said uniaxially oriented films, said uniaxially oriented films having an orientation of their crystalline phase characterized by X-ray scattering angles (ΔX) equal to or lower than 10° and said



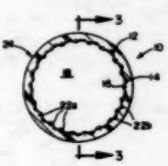
unoriented films having an X-ray scattering angle equal to or greater than 20°, said multilayer thermoformed article having on the whole a high orientation characterized by an X-ray scattering angle equal to or lower than 10° and a delamination strength of at least 0.4 kg/cm^2.

4,931,326

REINFORCED FLEXIBLE PLASTIC TUBING AND METHODS OF MANUFACTURE

Thomas L. Weil, Elverson, Pa., assignor to Davlyn Manufacturing Co., Inc., Chester Springs, Pa.

Filed Apr. 25, 1988, Ser. No. 185,718
Int. Cl.[5] B32B 7/00; H05K 9/00
U.S. Cl. 428—35.8 22 Claims



1. A composite tubular device comprising:

a flexible, plastic tube; and

a flexible, hollow, integrally tubular, porous member at least substantially embedded in the plastic tube, the member being integrally tubular before the member is incorporated into the composite tubular device and having an outer side defining a curved outer surface, an inner side defining a curved inner surface opposing the outer side, and macroscopic pores substantially uniformly distributed around and along the member and extending through the member between the outer and inner sides;

the plastic of the tube extending through a multiplicity of the pores between the inner and outer sides of the member.

4,931,327

WHITE OPAQUE OPP FILM FOR TAMPER EVIDENT PACKAGE

Leland L. Liu, Olm, Luxembourg; Michael T. Heffelfinger, Fairport, and Donald G. Whyman, Victor, both of N.Y., assignors to Mobil Oil Corporation, New York, N.Y.

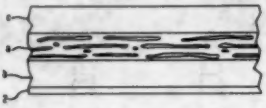
Filed Jun. 14, 1989, Ser. No. 366,094
Int. Cl.[5] B32B 3/26, 7/00; B65D 65/38
U.S. Cl. 428—36.5 21 Claims

1. A tamper-evident film comprising:

(a) an oriented polymer core layer having an upper face and a lower face;

(b) an oriented tamper-evident layer applied to at least the lower face, but also optionally to the upper face of core

layer (a), said layer (b) being fabricated from a mixture of a polyolefin and a filler which induces cavitation upon orientation, layer (b) having an internal cohesiveness which is less than the internal cohesiveness and bonding strength of packaging adhesives and heat seals; and



(c) an oriented skin layer applied to the upper face of core layer (a) if layer (b) has not been applied thereon, said layer (c) being fabricated from a member of the group consisting of homopolymers, copolymers or blends thereof.

4,931,328

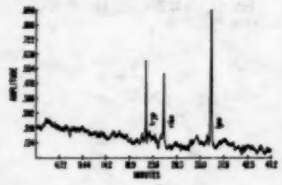
CAPILLARY TUBE WITH REDUCED PROTEIN INTERACTIONS AND CONTROLLABLE ELECTROOSMOTIC FLOW

Sally A. Swedberg, Los Altos, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Aug. 19, 1988, Ser. No. 234,456

Int. Cl.[5] B01D *61/42*

U.S. Cl. 428—36.91 **7 Claims**



1. A capillary tube defining an inner wall, useful for electrophoretic separations of proteins in solution, comprising:

an interfacial layer covalently bonded to the inner wall and effective to reduce interactions between the inner wall and protein solutes, the interfacial layer including a hydratable amphoteric phase, the amphoteric phase being a reaction product of a protein, a peptide or an ampholyte and an oxygen or nitrogen nucleophile.

4,931,329

ENCLOSURE FORMING ADAPTORS AND RELATED APPARATUS

Robert J. Sun, 1409 Ferry St., Easton, Pa. 19042

Division of Ser. No. 536,663, Sep. 28, 1983, abandoned. This application Mar. 12, 1986, Ser. No. 838,702

Int. Cl.[5] B65D *8/22, 8/16*

U.S. Cl. 428—36.92 **6 Claims**

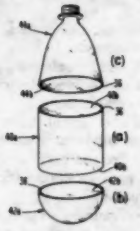
1. An enclosure formed from a pair of integral plastic containers comprising:

a first cross-sectioned portion of one of said integral containers having a sectioned open end, a side wall and an opposing closed end;

a first adaptor means fixedly secured to said open end, said first adaptor means having a central body portion, a channel structure integrally formed with said central body portion and projecting from one side thereof, said channel structure having a pair of opposing legs, and a lip structure protruding outwardly from the plane of said first central body portion;

a second cross-sectioned portion of the remaining integral container having a sectioned open end, a side wall and an opposing closed end;

a second adaptor means fixedly secured to the open end of the second cross-sectioned portion, said second adaptor means having a central body portion, and a channel structure integrally formed with said central body portion and projecting from one side thereof, said channel portion



having a pair of opposing legs and a lip structure protruding outwardly from the plane of said central body portion of said second adaptor means, said protruding lip structure of said first adaptor means and said protruding lip structure of said second adaptor means interlocking with each other to fixedly secure the first and second adaptor means together.

4,931,330

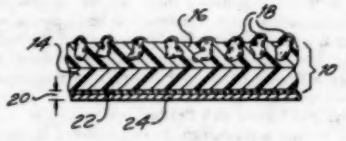
PREFABRICATED, SLIP-RESISTANT SURFACE COATING

Sam S. Stier, 620 NW. 76th Ter., Plantation, Fla. 33324, and Robert E. Kaufman, 11615 NE. 20th Dr., North Miami, Fla. 33181

Continuation of Ser. No. 751,542, Jul. 3, 1985, abandoned. This application Mar. 29, 1988, Ser. No. 178,764

Int. Cl.[5] B32B *5/16, 7/10, 19/02, 27/36*

U.S. Cl. 428—40 **15 Claims**



1. A prefabricated, self-adhesive and slip-resistant surface coating, comprising:

a non-deformable polyethylene terephthalate sheet member providing two opposing surfaces, said sheet member being of a thickness of about 0.005 inches and is rigid and resists shear on said two opposing surface;

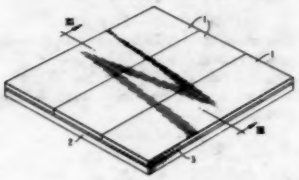
a film on one surface of said sheet member, said film comprising an acrylic polyurethane and having completely imbedded therein a plurality of finely-divided abrasive silica particles, said particles having an average diameter of from about 150 to 200 microns, said particles being completely covered by said acrylic polyurethane film; and

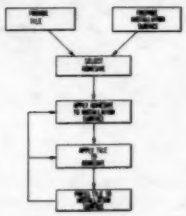
an adhesive layer on the other surface of said sheet member for enabling said surface coating to be attached to any desired location on a smooth receiving surface.

4,931,331
LAMINATED TILE PRODUCT, METHOD FOR PRODUCING THE SAME AND METHOD FOR INSTALLING THE SAME

Charles R. Owens, 6100 Valley View Dr., Alexandria, Va. 22310

Filed Apr. 5, 1988, Ser. No. 177,947
Int. Cl.[5] B32B *3/14*
U.S. Cl. 428—47 17 Claims





1. A laminated tile for installation on an installation surface by a layer of adhesive, said laminated tile having a predetermined overall thickness comprising:

a fused, fired, impact-resistant ceramic substrate having opposed, unglazed first and second major surfaces;

a layer of natural stone; and

an adhesive bonding said layer of natural stone to said first major surface of said ceramic substrate;

wherein said laminated tile has higher impact resistance and load-bearing strength than a solid all natural stone tile having said predetermined overall thickness.

4,931,332
NON-WARPING AND TORQUE RESISTANT STRUCTURAL PANEL FOR PANELING, FURNITURE AND FLOORING

Richard L. Dukart, and Blaine R. Dukart, both of Box 266, Dickinson, N. Dak. 58601

Filed Mar. 1, 1989, Ser. No. 317,505
Int. Cl.[5] B32B *3/10*
U.S. Cl. 428—50 17 Claims

1. A non-warping structural panel, comprising:

(a) a first laminate and a second laminate for supporting said first laminate;

(b) said first laminate secured to said second laminate;

(c) said first laminate including a plurality of first, second, third, and fourth squares arranged in a side by side relation to one another and forming an overall pattern;

(d) said plurality of squares in said first laminate including at least one of said first square, one of said second square, one of said third square and one of said fourth square;

(e) said first square being of a dimension different from said second, third and fourth squares;

(f) said second square being of a dimension different from said first, third and fourth squares;

(g) said third square being of a dimension different from said first, second and fourth squares;

(h) said fourth square being of a dimension different from said first, second and third squares;

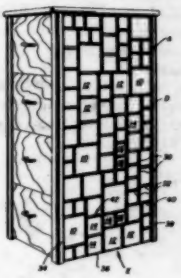
(i) said first square being the largest square;

(j) said second square being smaller than the first square;

(k) said third square being smaller than the second square;

(l) said fourth square being smaller than the third square;

(m) said first, second, third, and fourth squares when positioned in relation to each other forming in at least a portion of said overall pattern at least one random pattern there being in said overall pattern at least one of said first squares, and at least two of said second, third and fourth squares each;



(n) said random pattern having four sides;

(o) said squares on at least two adjacent sides of said random pattern being positioned so as to form in said two adjacent sides straight edges;

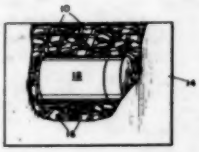
(p) said squares having bevelled edges; and

said squares each having apices and said squares arranged so that at least one apex of one square is intermediate and offset from the apices of its adjacent square thereby producing a warp resistant panel due to offsetting apices of said squares which resist warp and torque.

4,931,333
THERMAL PACKAGING ASSEMBLY

D. Lindley Henry, 2733 Shelter Island Dr., Suite 318, San Diego, Calif. 92106

Continuation of Ser. No. 8,545, Jan. 29, 1987, abandoned, which is a continuation-in-part of Ser. No. 779,146, Sep. 23, 1985, abandoned. This application Sep. 9, 1988, Ser. No. 243,207
Int. Cl.[5] F25D *3/08, 5/00*
U.S. Cl. 428—76 11 Claims



1. A thermal packaging assembly, comprising

an outer container a plurality of separate reusable capsules in said each container each capsule comprising a continuous outer skin of flexible plastics material and a thermal controlling agent completely filling the capsule, the agent being a liquid in a predetermined temperature range, frozen freezable into a solid phase prior to use in the packaging assembly;

said outer container comprising means for packing the capsules around one or more items to be packed, the container

having an opening for receiving the capsules and items to be packed;

the capsules each being of identical shape and dimensions and each having opposed sloping, curved outer surfaces for resisting close packing against adjacent capsules in the packaging assembly and for forming air gaps between each capsule and the next adjacent capsules;

the capsules comprising means for cushioning an item or items around which they are packed, means for absorbing shocks by moving freely relative to one another and means for maintaining a predetermined temperature range for an extended period of time.

4,931,334

IMAGE RECEIVING WEB FOR ADHESIVE TRANSFER

Etsuo Shiozawa; Keishi Kato, and Yoshiki Yoshimi, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Division of Ser. No. 133,458, Dec. 15, 1987, Pat. No. 4,863,453. This application Jan. 9, 1989, Ser. No. 294,839

Claims priority, application Japan, Dec. 16, 1986, 61-299168; Dec. 16, 1986, 61-299169

Int. Cl.[5] B32B *3/00*

U.S. Cl. 428—137 **4 Claims**

1. An image receiving web for adhesive transfer comprising a belt-shaped, release agent coated paper, and a plurality of transfer sheets each of which is provided with an image receiving adhesive surface for receiving a toner image transferred from a photosensitive material drum carrying said toner image on the surface by being contacted under pressure with said photosenstive material drum, and is formed in a predetermined sizE for carrying said toner image thereon, said transfer sheets being adhered to said belt-shaped, release agent coated paper in the condition put side by side in the longitudinal direction of said release agent coated paper with said image receiving adhesive surfaces facing said release agent coated paper.

4,931,335

UNDERWATER DIVER'S DRY SUIT AND METHOD OF SEALING

Richard W. Long, and Robert T. Stinton, both of San Diego, Calif., assignors to Diving Unlimited International, Inc., San Diego, Calif.

Division of Ser. No. 182,384, Apr. 18, 1988, Pat. No. 4,882,785, which is a division of Ser. No. 694,703, Jan. 23, 1985, Pat. No. 4,778,643, which is a continuation of Ser. No. 476,472, May 25, 1983, abandoned, which is a division of Ser. No. 372,625, Apr. 28, 1982, Pat. No. 4,388,134. This application Aug. 18, 1989, Ser. No. 395,529

Int. Cl.[5] B32B *3/02*

U.S. Cl. 428—57 **6 Claims**

1. A material for use in making at least part of a dry suit comprising:

at least two sections of a composite material abutted and secured together along at least one pair of adjacent edges, the material comprising an outer layer of waterproof material, an inner layer of material, and a middle layer of permanently collapsible cellular material disposed between said outer layer and said inner layer, the abutted edges comprising a seam line formed by compressing the material of both sections to permanently collapse the cellular material of the middle layer.

4,931,336

INFORMATION RECORDING MEDIUM AND METHOD OF OPTICALLY RECORDING INFORMATION EMPLOYING THE SAME

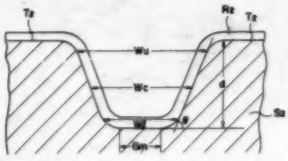
Norihisa Haneda, Shizuoka, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jan. 17, 1989, Ser. No. 297,565

Claims priority, application Japan, Jan. 18, 1988, 63-8048; Jun. 15, 1988, 63-149055

Int. Cl.[5] B32B *3/02*

U.S. Cl. 428—64 **6 Claims**



1. An information recording medium comprising a disc-shaped substrate provided with a spirally formed concave groove on its surface and recording layer for optically recording and reproducing information by means of a laser beam which is provided on the substrate, wherein both corner portions facing each other and top portions of both side walls facing each other in said concave groove are radiused, and the concave groove has a shape in the radial direction which is determined by the following formulae (I) and (II):

$$Wu > Wc + d \cdot \tan(90 - \theta) \quad \text{(I)}$$

$$Wl < Wc - d \cdot \tan(90 - \theta) \quad \text{(II)}$$

in which each symbol has the following meaning:

d: depth of the concave groove from the bottom surface of the groove to the top portion of the wall of the groove;

Wu: width of the concave groove at height of 90% of the depth of the groove from the bottom surface of the groove;

Wl: width of the concave groove at height of 10% of the depth of the groove from the bottom surface of the groove;

Wc: width of the concave groove at height of 50% of the depth of the groove from the bottom surface of the groove; and

θ: angle formed by a tangent of the bottom surface of the concave groove at the center position and a tangent of the side wall of the groove at the center position.

4,931,337

INFORMATION RECORDING MEDIUM

Takeshi Miyazaki, and Tetsuro Fukui, both of Kawasaki, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 9, 1988, Ser. No. 154,002

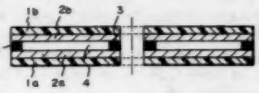
Claims priority, application Japan, Feb. 12, 1987, 62-31068

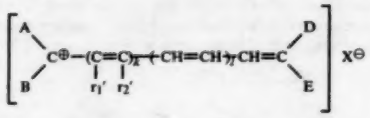
Int. Cl.[5] B32B *3/02*

U.S. Cl. 428—64 **2 Claims**

1. An information recording medium, comprising: a pair of substrates, at least one of said substrates having a recording

layer containing a cationic organic coloring matter, said cationic organic coloring matter having the formula





wherein A, B, D and E are independently hydrogen or selected from the group consisting of alkyl, alkenyl, substituted or unsubstituted aralkyl, substituted or unsubstituted aryl, substituted or unsubstituted styryl and a substituted or unsubstituted heterocyclic group; r_1' and r_2' are independently alkyl, cyclic alkyl, alkenyl group, substituted or unsubstituted aralkyl or aryl; k represents 0 or 1; l represents 0–2; and X^- is an anion, said substrates being adhered together with an adhesive thereby defining a space interposed therebetween, wherein said adhesive contains an epoxy monomer and a compound capable of generating a Lewis acid by irradiation with light.

4,931,338

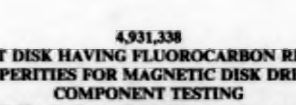
TEST DISK HAVING FLUOROCARBON RESIN ASPERITIES FOR MAGNETIC DISK DRIVE COMPONENT TESTING

Mark A. Toffle, St. Louis Park, Minn., assignor to Magnetic Peripherals Inc., Minnetonka, Minn.

Filed Sep. 14, 1988, Ser. No. 244,202

Int. Cl.[5] B32B *3/02*; G11B *5/82*

U.S. Cl. 428—65 **8 Claims**



1. A rigid transparent glass disk for use in testing the mechanical response characteristics of a slider carrying a transducer in a magnetic disk memory unit and to replace the unit's magnetic recording disk during said testing, said disk having projections thereon formed of a fluorocarbon resin with modifiers, and having a preselected footprint shape and size and a preselected projection height above the surrounding surface; the height selected by means of burnishing the top of the projection with a burnishing slider flying at said preselected height.

4,931,339

INTUMESCENT SEALS

Tessa Malcolm-Brown, Cambridge, England, assignor to Dixon International Limited, England

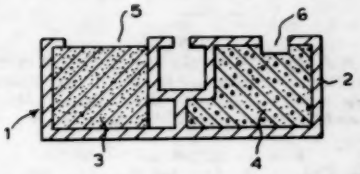
PCT No. PCT/GB87/00585, § 371 Date Feb. 13, 1989, § 102(e) Date Feb. 13, 1989, PCT Pub. No. WO88/01335, PCT Pub. Date Feb. 25, 1988

PCT Filed Aug. 20, 1987, Ser. No. 317,479

Claims priority, application United Kingdom, Aug. 20, 1986, 8620257; Oct. 17, 1986, 8624928

Int. Cl.[5] B32B *1/04, 1/06, 9/00*

U.S. Cl. 428—71 **28 Claims**



1. An intumescent seal comprising a first body or mass of an intumescent material which produces a hard foam on heating and a second body or mass of an intumescent material which produces a soft foam in heating, the intumescent materials being carried by one or more of a plurality of members or parts which at least when they are in a predetermined position relative to each other define a gap, which gap can be sealed by either of the foams produced by the intumescent material under fire conditions, one said body or mass being disposed relatively near one margin of the gap and the other said body or mass being disposed relatively remote from said margin such that the foam produced by said one body or mass separates the other body or mass and the foam produced thereby from said margin.

4,931,340

HONEYCOMB PANEL STRUCTURE

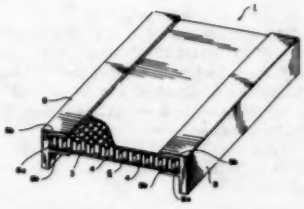
Takeaki Baba, Chofu; Keizo Nanba, Nagoya; Yoshio Takeshima, Ueno; Hiromichi Sano, Chiryu; Koji Tobita, Hiroshima; Atsuo Muneto, Hiroshima; Toshihiro Hara, Hiroshima, and Kazuki Fujise, Hiroshima, all of Japan, assignors to Sumitomo Light Metal Industries, Ltd., Tokyo, Japan

Filed Dec. 22, 1986, Ser. No. 944,869

Claims priority, application Japan, Dec. 28, 1985, 60-204174[U]

Int. Cl.[5] B32B *3/12*

U.S. Cl. 428—73 **7 Claims**



1. A honeycomb panel structure comprising:

a honeycomb panel having a honeycomb core, and two facing plates attached to the upper and lower surfaces, respectively, of said core, said honeycomb panel having a first neutral axis which passes through the center of grav-

ity of, and extends in the longitudinal direction of, said panel; and

a pair of housings each having a base portion and two parallel projections extending from said base portion which form an engagement channel of substantially uniform cross-section therebetween for engaging said panel without deformation of said core, said base portion for each of said housings extending beyond said projections in a non-parallel direction such that said pair of housings has a second neutral axis which passes through the centers of gravity of said pair of housings parallel to said first neutral axis and spaced from said first neutral axis by a predetermined distance in the direction of loading, thereby providing said panel structure with increased flexural rigidity.

4,931,341

ELASTIC SUCTION PLATES FOR DELICATE OBJECTS

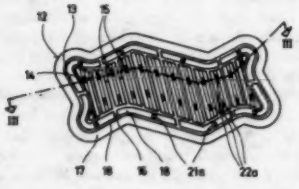
Dieter Haffer, Vallendar, and Hermann J. Jost, Kamp-Bornhofen, both of Fed. Rep. of Germany, assignors to Masa Maschinenfabrik Olga Kossmann, Andernach, Fed. Rep. of Germany

Filed Jan. 18, 1989, Ser. No. 298,134

Claims priority, application Fed. Rep. of Germany, Jan. 21, 1988, 3801666

Int. Cl.[5] B32B *3/02, 3/10*

U.S. Cl. 428—81 **13 Claims**



1. A low-pressure suction plate made of elastically deformable material and suitable for lifting and transporting concrete interlocking paving stones immediately after their manufacture, which suction plate comprises an elastomer body member for connection to a rigid low pressure connecting means, such body member comprising a continuous sealing lip extending around the outer contour of said body member and enclosing a total suction space which is divided into a plurality of elongated suction chambers each having a continuous seal thereabout and forming an individually sealed suction space when said suction plate is placed on a surface of an object to be lifted, each of said suction chambers being in flow communication with said low-pressure connection means through at least one connecting channel, said channel having at least one change in the direction along its length.

4,931,342

ACCORDION FOLDED LAMINATE OF FIBER SHEET REINFORCED WITH THERMOPLASTIC FILM

Thomas W. Tolbert, Fort Mill, S.C.; Jeffrey S. Dugan, Matthews, N.C.; John V. Cauthen, Van Wyck, and James E. Hendrix, Spartanburg, both of S.C., assignors to Springs Industries, Inc., Fort Mill, S.C.

Filed Nov. 16, 1987, Ser. No. 120,864

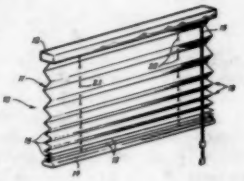
Int. Cl.[5] E06B *3/94*

U.S. Cl. 428—90 **14 Claims**

1. In a window shade assembly including a shade support for mounting at a portion of a window, an accordion folded shade having a series of panels formed by alternately directed folds, said shade being oriented with the folds extending horizontally and supported at its upper end to the shade support for hanging downwardly at the window opening, draw string openings formed in said panels, a draw string assembly connected in supporting relationship to the lower portion of said shade and extending upwardly through the openings of the panels of said shade and through said shade support for raising and lowering the shade, the improvement therein of

said shade comprising a laminate formed of a fiber sheet and a thermoplastic sheet with an intermediate layer of adhesive bonding said sheets together uniformly over their facing surfaces, said adhesive having a temperature of liquification lower than the temperature of liquification of said thermoplastic sheet,

said laminate characterized by having been folded into an accordion folded configuration and the panels of the accordion folded laminate compressed to substantially flat overlying stacked relationship with respect to each other



and while the panels are compressed heat having been applied to the folds of the compressed stack of panels to raise the temperature of the adhesive in the folds of the panels above the temperature of liquification of the adhesive and sufficiently high to allow for significant molecular rearrangement of the thermoplastic sheet to relieve stresses in the thermoplastic sheet in the vicinity of the folds, and then cooled to a temperature lower than the temperature of liquification of the adhesive so that the adhesive was first liquefied and later solidified to create a memory in each fold, with the fold memory of each fold being sufficient to require the panels to assume an S-shape when the panels are stretched away from one another.

4,931,343

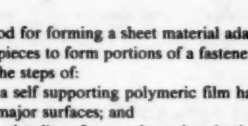
SHEET MATERIAL USED TO FORM PORTIONS OF FASTENERS

Dennis L. Becker; Miroslav Tochacek, and Paul E. Hansen, all of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Continuation-in-part of Ser. No. 760,999, Jul. 31, 1985. This application Jan. 22, 1988, Ser. No. 147,137

Int. Cl.[5] B32B *3/02*

U.S. Cl. 428—95 **32 Claims**



1. A method for forming a sheet material adapted to be cut into smaller pieces to form portions of a fastener, said method comprising the steps of:

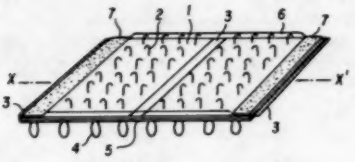
providing a self supporting polymeric film having first and second major surfaces; and

stitching a plurality of yarns through only the film to form loops projecting from the first surface of the film and form locking portions of the stitches adjacent the second surface of the film.

4,931,344
FASTENER COMPONENT

Kunihiko Ogawa, Tsurugashimamachi, and Yoshio Noguchi, Sakado, both of Japan, assignors to Kuraray Company, Ltd., Kurashiki, Japan

Continuation-in-part of Ser. No. 140,112, Dec. 30, 1987, Pat. No. 4,842,916. This application Dec. 15, 1988, Ser. No. 284,682
Claims priority, application Japan, Dec. 15, 1987, 62-191246[U]
Int. Cl.[5] A44B *21/00*
U.S. Cl. 428—100 16 Claims

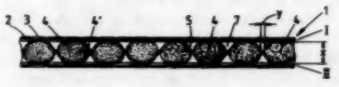


1. A fastener component comprising:
(a) a substrate member having a multitude of hook-shaped fastening elements on one side thereof and anchoring means on the other side thereof; and
(b) at least one elongate flat portion of said one side of said substrate member which is void of said hook-shaped fastening elements,
(c) wherein said at least one elongate portion comprises a single longitudinal flat portion provided substantially at the center of said one side of said substrate member.

4,931,345
STRUCTURE WITH A MULTIPLY FABRIC REINFORCEMENT AND A METHOD FOR PRODUCING SAME

Wolfgang Böttger, Ködnitz, and Kurt Biedermann, Kulmbach, both of Fed. Rep. of Germany, assignors to Vorwerk & Co. Interbolding GmbH, Fed. Rep. of Germany

Filed Jul. 18, 1988, Ser. No. 219,784
Claims priority, application Fed. Rep. of Germany, Jul. 17, 1987, 3723680; Jun. 8, 1988, 3819440
Int. Cl.[5] B32B *3/12*
U.S. Cl. 428—116 26 Claims

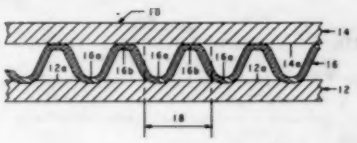


1. A structure comprising a multiply fabric that includes plies and filling threads extending between the plies, wherein the multiply fabric is composed of a yarn such as aramid fiber, carbon fiber, ceramic fiber or fiberglass, wherein the filling threads are incorporated in the form of weft threads made from a polypropylene or polyamide thread group, and including a resin which has been impregnated within said multiply fabric and cured.

4,931,346
LIGHTWEIGHT LAMINATED PAPERBOARD

D. Juan Nogueras Dardina, Mataro (Barcelona), Spain, assignor to Book Covers Inc., Cranford, N.J.

Filed Dec. 19, 1988, Ser. No. 287,562
Int. Cl.[5] B32B *3/28*
U.S. Cl. 428—182 18 Claims



1. A laminated paperboard, comprising:
a first layer of paperboard having a thickness in the range of 0.3 mm to 1.5 mm;
a second layer of paperboard having a thickness in the range of 0.3 mm to 1.5 mm;
the outer surfaces of said first and second layers being flat and smooth;
a first internal layer of contoured paperboard having a thickness in the range of 0.23 mm to 0.5 mm and having grooves and ridges and being disposed between and glued to the inner surfaces of each of said first and second layers of paperboard and wherein the grooves and ridges have a height in the range of 0.90 mm to 1.2 mm;
said first internal layer of contoured paperboard having in the range of 350 to 400 sets of grooves and ridges per linear meter of paperboard; and
the curved surfaces on one side of said first internal layer of contoured paperboard being indented within the inner surface of said second layer of paperboard by at least 0.1 mm to increase the area of surface contact and gluing area between said layers to thereby increase the rigidity and strength of said laminated paperboard.

4,931,347
TRANSLUCENT PRESSURE-SENSITIVE ADHESIVE SYSTEMS

Manuel Slovinsky, Sao Paulo, Brazil, and Jeffrey R. Tarizzo, Ann Arbor, Mich., assignors to Nalco Chemical Company, Naperville, Ill.

Filed Sep. 19, 1988, Ser. No. 245,511
Int. Cl.[5] B32B *5/16*; C09J *7/02*
U.S. Cl. 428—192 18 Claims

1. An adhesive system in the form of a sheet or tape comprising a pressure-sensitive adhesive matrix and particulate solids dispersed in said matrix, said matrix having a thickness of from about 25 to about 60 mils, the improvement in which comprising:
said particulate solids having a particle size of no greater than 300 microns;
said particulate solids being present in said matrix in the amount of from about 5 to about 25 weight percent based on total weight of said particulate solids and said matrix; and
said particulate solids being polymers derived from ethylenically-unsaturated monomers, said polymers being comprised of at least 60 mole percent of units having the structure of Formula I:

Formula I

wherein R_1 is hydrogen or methyl, and R_2 is a polar group, whereby said adhesive system transmits light to the extent of from about 15 to about 80 percent transmission.

3. The adhesive system of claim 1 wherein said pressure-sensitive adhesive matrix includes a coating of unfilled pressure-sensitive adhesive material along at least one side thereof.

4,931,348

REDUCED THICKNESS RESIN SUBSTRATE IN FILM PRINTING RIBBON

David R. Kluch, Lexington; Jack W. Morris, Nicholasville; Kent G. Urdahl, and Matthew K. Zimmer, both of Lexington, all of Ky., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 31, 1987, Ser. No. 91,222

Int. Cl.[5] B32B *3/14, 27/08;* **B41J** *31/00*

U.S. Cl. 428—207 **5 Claims**

1. A film printer ribbon having a substrate of thickness of less than 0.35 mil consisting essentially of a blend of polyethylene and a copolymer comprising isotactic polypropylene and polyethylene, said polyethylene in said copolymer being in an amount sufficient to promote mixing and long term stability of said blend while said copolymer remains essentially isotactic polypropylene, said substrate carrying an ink to be transferred by impact printing.

4,931,349

ELECTROPHOTOGRAPHIC PHOTORECEPTOR HAVING AN AZO COMPOUND

Masaru Hasegawa, Tokyo; Osamu Suda, Omiya; Hisao Kohno, Funabashi; Toshifumi Sekino, Kawaguchi; Tetsuhiro Umezaki, Koshigaya, and Norio Tanaka, Tokyo, all of Japan, assignors to Dainichiseika Color & Chemicals Mfg. Co., Tokyo, Japan

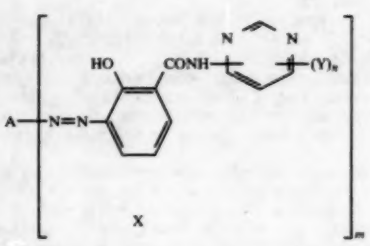
Filed Dec. 1, 1987, Ser. No. 128,592

Claims priority, application Japan, Dec. 1, 1986, 61-284295

Int. Cl.[5] G03G *5/06*

U.S. Cl. 430—58 **2 Claims**

1. In an electrophotographic photoreceptor having a photosensitive layer, the improvement wherein the photosensitive layer contains an azo compound having the formula (II):



wherein m is an integer of 1-4; A is a group having a valence of m and is selected from the group consisting of (a) hydrocarbon groups having at least one benzene ring, (b) nitrogen-containing hydrocarbon groups having at least two benzene rings, and (c) hydrocarbon groups having at least two benzene rings and at least one heterocyclic ring; X is a residuum capable of condensing with a benzene ring to form a substituted or unsubstituted aromatic hydrocarbon ring or a substituted or unsubstituted aromatic heterocyclic ring; Y is selected from the group consisting of a hydrogen atom, a halogen atom, an alkyl group, and alkoxy group; and n is an integer of 0-3.

4,931,350

ELECTROPHOTOGRAPHIC PHOTOCONDUCTOR HAVING AN ARYLALKYLENEARYLAMINO PHOTOCONDUCTOR

Tomoyuki Shimada, Numazu; Masaomi Sasaki, Susono, and Mitsuru Hashimoto, Numazu, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

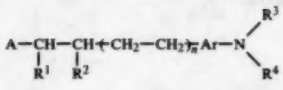
Continuation-in-part of Ser. No. 144,811, Jan. 15, 1988, abandoned. This application Oct. 18, 1988, Ser. No. 259,555

Claims priority, application Japan, Jan. 20, 1987, 62-009073; Jan. 20, 1987, 62-009074; Jan. 20, 1987, 62-009075; Jan. 21, 1987, 62-012967; Oct. 20, 1987, 62-265663

Int. Cl.[5] G03G *5/10*

U.S. Cl. 430—59 **15 Claims**

1. An electrophotographic photoconductor comprising an electroconductive support and a photoconductive layer formed thereon comprising at least one amino compound of the formula:



wherein A represents a substituted or unsubstituted aromatic hydrocarbon group; R^1 and R^2 each represent hydrogen, a substituted or unsubstituted alkyl group, a substituted or unsubstituted aryl group, or a substituted or unsubstituted aralkyl group; Ar represents a substituted or unsubstituted aromatic hydrocarbon group, or a substituted or unsubstituted heterocyclic ring; R^3 and R^4 each represent a substituted or unsubstituted alkyl group, a substituted or unsubstituted aralkyl group, or a substituted or unsubstituted aryl group, and n is an integer of 0, 1 or 2.

4,931,351

BILAYER LITHOGRAPHIC PROCESS

William C. McColgin, Pittsford; Thomas B. Brust, Spencerport; Robert C. Daly, Rochester; Joseph Jech, Jr., Rochester, and Robert D. Lindholm, Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation of Ser. No. 2,077, Jan. 12, 1987, abandoned. This application Jul. 13, 1989, Ser. No. 378,471

Int. Cl.[5] G03C *5/00, 5/40*

U.S. Cl. 430—323 **7 Claims**

1. A method for producing a patterned high resolution, thermally and dimensionally stable resist image on a substrate comprising the steps of:

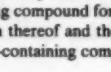
(a) forming a planarizing layer resistant to silicon uptake on a substrate,

(b) providing a positive-working photoresist composition containing —OH or —NH— groups over said planarizing layer.

(c) imagewise exposing said resist to activating radiation,

(d) developing said exposed resist,

(e) contacting said developed resist with a vapor comprising a silicon-containing compound for a time less than 2 hours to effect silylation thereof and thereby impart etch resistance, said silicon-containing compound having the structural formula:



wherein:

X^1 and X^2 are individually chloro or

wherein R^3 and R^4 are individually H or alkyl containing from 1 to 3 carbon atoms; and R^1 and R^2 are individually H or alkyl containing from 1 to 3 carbon atoms; and wherein at least one of R^1, R^2, R^3 and R^4 is H; and

(f) contacting said planarizing layer with an oxygen-containing plasma so as to preferentially remove portions thereof.

4,931,352

ANTIFUNGAL FERMENTATION PRODUCT

Robert A. Fromtling, Westfield; Robert A. Giacobbe, Lavallette; Jerrold M. Liesch, Princeton Junction, all of N.J.; Sagrario M. Del Val, Madrid, Spain; Robert E. Schwartz, and Carol F. Wichmann, both of Westfield, N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation of Ser. No. 105,795, Oct. 7, 1987, abandoned. This application Jun. 7, 1989, Ser. No. 362,647

Int. Cl.[5] C12P *21/04*

U.S. Cl. 435—71.3 **9 Claims**

1. An antifungal antibiotic compound which is a white, amorphous solid having

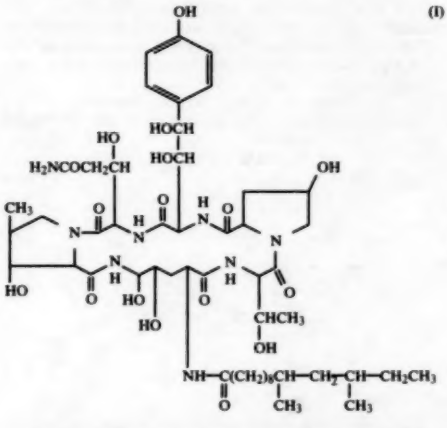
a. a decomposition temperature of 206°–214° C.;

b. an empirical formula of $C_{51}H_{82}N_8O_{17}$ obtained by high resolution Fast Atom Bombardment mass spectral analysis;

c. a ^1H NMR spectra in CD_3OD at 400 MHz recorded in FIG. 1 and

d. ^{13}C NMR chemical shifts in CD_3OD at 100 MHz of: 11.20, 11.64, 19.75, 20.25, 20.78, 27.00, 28.07, 30.33, 30.37, 30.61, 30.76, 31.19, 31.29, 32.94, 34.83, 36.69, 38.10, 38.54, 39.07, 39.53, 45.93, 51.39, 53.01, 55.59, 56.31, 57.11, 58.35, 62.43, 68.18, 70.08, 70.55, 70.61, 71.26, 73.94, 75.72, 75.84, 76.86, 116.06 (x2), 129.43(x2), 132.86, 158.22, 168.80, 172.16, 172.35, 172.40, 173.12, 174.24, 175.47, 176.88 ppm.

2. A compound according to claim 1 which is represented by the formula:



(I)

and is named 1-[(4R, 5R)-4,5-dihydroxy-N^2-(10, 12-dimethyl-1-oxotetradecyl)-L-ornithine]-5-(threo-3-hydroxy-1-glutamine)-echinocandin B.

3. An antifungal composition which comprises a compound of claim 2 in admixture with a biologically inert carrier.

4,931,353

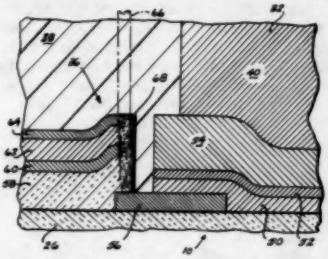
STRUCTURE AND METHOD FOR SELECTIVELY PRODUCING A CONDUCTIVE REGION ON A SUBSTRATE

Minas H. Tanielian, Bellevue, Wash., assignor to The Boeing Company, Seattle, Wash.

Division of Ser. No. 317,739, Mar. 1, 1989. This application Nov. 22, 1989, Ser. No. 440,766

Int. Cl.[5] H01L *21/283*

U.S. Cl. 437—200 **10 Claims**



1. A method for selectively providing electrical continuity between two conductors in an integrated circuit, comprising the steps of:

(a) forming a layer of silicon between the two conductors;

(b) forming a barrier layer of a metallic material that is chemically nonreactive with silicon and does not diffusively mix with silicon below a substantially elevated reaction temperature, on the layer of silicon so that the barrier layer is prevented from electrically connecting to the two conductors by the silicon layer;

(c) forming on the barrier layer, a layer of an electrically conductive material that is chemically reactive with silicon at a temperature substantially below the reaction temperature, so the electrically conductive material is separated from the layer of silicon; and

(d) selectively heating a limited area of the substrate, including at least portions of the barrier layer and of the layer of electrically conductive material, above the reaction temperature, causing the electrically conductive material and the metallic material to react with the silicon, producing conductive silicides, thereby providing electrical continuity between the two conductors through the conductive silicides and the layer of electrically conductive material.

4,931,354

MULTILAYER PRINTED CIRCUIT BOARD

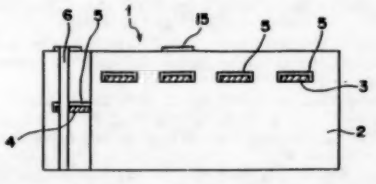
Kikuo Wakino, Muko, and Harufumi Mandai, Iakatsuki, both of Japan, assignors to Murata Manufacturing Co., Ltd., Japan

Filed Nov. 1, 1988, Ser. No. 265,500

Claims priority, application Japan, Nov. 2, 1987, 62-278837; Nov. 2, 1987, 62-278838

Int. Cl.[5] B32B *9/00*

U.S. Cl. 428—209 **6 Claims**



1. A multilayer printed circuit board comprising monolithic insulating layers and an internal wiring conductor layer lo-

cated on a surface of at least one of said insulating layers and forming an internal conductor path, said conductor path in said internal conductor layer being locally separated from an adjacent insulating layer by a closed internal cavity located about said internal conductor path which reduces the dielectric constant of said multilayer printed circuit board.

4,931,355

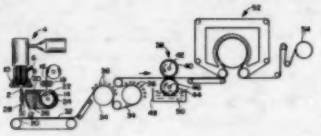
NONWOVEN FIBROUS HYDRAULICALLY ENTANGLED NON-ELASTIC COFORM MATERIAL AND METHOD OF FORMATION THEREOF

Fred R. Radwanski, 4310 Mary Ct., Norcross, Ga. 30092; Lloyd E. Trimble, Rte. 2, Box 33A, Dustin, Okla. 74839; Leon E. Chambers, Jr., 245 Mill Creek Pl., Roswell, Ga. 30076, and Linda A. Connor, 76 Spalding Trail, Atlanta, Ga. 30328

Filed Mar. 18, 1988, Ser. No. 170,208

Int. Cl.[5] B32B *5/16*

U.S. Cl. 428—283 **26 Claims**



1. A nonwoven fibrous non-elastic web comprising a substantially homogeneous admixture of non-elastic meltblown fibers and at least one type of secondary fibers wherein said non-elastic meltblown fibers are hydraulically entangled with said secondary fibers.

4,931,356

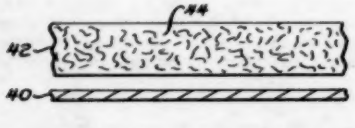
SHEET MATERIAL

Kenneth W. Misevich, Griswold, Conn., and Thomas E. Mintel, Rahway, N.J., assignors to Colgate-Palmolive Company, Piscataway, N.J.

Filed Nov. 17, 1988, Ser. No. 273,365

Int. Cl.[5] B32B *5/16*

U.S. Cl. 428—283 **12 Claims**



1. A sheet material which deforms to the shape of non-uniform pressure distribution, comprising:

a single consolidated web comprising a fluid imprevious cover sheet adhered to a batt of fibrous material having small granules dispersed therein and bonded together in a waxy material.

4,931,357

VARIABLE TRANSVERSE WEBBER AND STRATIFIED WEBS FORMED THEREWITH

Gerald M. Marshall, Somerville, and Allan P. Farrington, Englishtown, both of N.J., assignors to Chicopee, New Brunswick, N.J.

Division of Ser. No. 99,877, Sep. 22, 1987. This application Jan. 17, 1989, Ser. No. 297,729

Int. Cl.[5] B32B *5/08, 5/12, 5/26;* **D04H** *1/70*

U.S. Cl. 428—284 **5 Claims**

1. A fibrous structure having at least two integral layers, comprising

a first layer having at least a first fiber material in a first zone toward one lateral edge, at least a second fiber material in a second zone toward the other lateral edge, and a first transition zone of first and second fibers in between said first and second zones, said first and second fiber materials being distributed within said first layer and said first and second zones in a predetermined ratio of first fiber material to second fiber material;

a second layer having at least a third fiber material in a third zone toward one lateral edge, at least a fourth fiber material in a fourth zone toward the other lateral edge, and a second transition zone of third and fourth fibers in between said third and fourth zones, said third and fourth fiber materials being distributed within said second layer and said third and fourth zones in a predetermined ratio of third fiber material to fourth fiber material there being a further transitional zone of said first, second, third and fourth fibers between said first and second layers; and wherein

the ratio of first fiber material to second fiber material is independent of the ratio of third fiber material to fourth fiber material, and the thickness of the first layer is independent of the thickness of the second layer.

4,931,358

FIBER-REINFORCED THERMOPLASTIC PANELS

Ludwig Wahl, Schifferstadt, and Helmut Vogel, Bramsche, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Dec. 9, 1988, Ser. No. 281,754

Claims priority, application Fed. Rep. of Germany, Dec. 9, 1987, 3741669

Int. Cl.[5] B32B *15/00*

U.S. Cl. 428—285 **3 Claims**

1. Fiber-reinforced thermoformable semifinished material containing a thermoplastic polymer and a needled textile fabric, wherein the textile fabric consists of

at least two layers A of continuous filament yarn oriented in at least one preferred direction, each having an areal mass of not more than 300 g/m^2 and

at least one layer B of unoriented fibers in a ratio by mass of A:B from 80:20 to 40:60, wherein the textile fabric is built up from layers arranged as ABAB or ABABAB or ABABABAB.

4,931,359

ELECTROSTATIC RECORDING MEDIUM

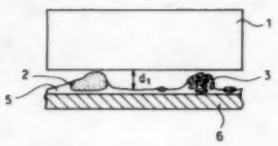
Hisanori Yagi, Ibaraki; Kousuke Hamada, Amagasaki; Isamu Nakano, Takatsuki, and Yoshihiro Nishimura, Amagasaki, all of Japan, assignors to Kanzaki Paper Manufacturing Company, Ltd., Tokyo, Japan

Filed Jul. 15, 1988, Ser. No. 219,385

Claims priority, application Japan, Jul. 24, 1987, 62-186097; Dec. 2, 1987, 62-306266

Int. Cl.[5] B32B *5/16;* **G03G** *13/04*

U.S. Cl. 428—325 **18 Claims**



1. An electrostatic recording medium comprising an electroconductive support and a dielectric layer formed on the electroconductive support and containing an insulating resin and a pigment, characterized in that said pigment comprises kaolin having a quartz content of not more than 1% by weight and that said dielectric layer has, on the surface thereof, projec-

tions based on said pigment and having an equivalent diameter of 5–15 μm as spacers, the equivalent diameter meaning the value d defined by the equation:

$$d=2\,(s/\pi)^{\frac{1}{2}}$$

where s is the project area of a projection as found when the dielectric layer surface is observed under a scanning electron microscope.

4,931,360

DEORDORIZING SHEET WITH A DEODORIZING COATING FORMULATION

Akira Hoshino, Koshigaya; Mikio Saji, Kasukabe, and Shigeaki Fujii, Washinomiya, all of Japan, assignors to Dainichiseika Color & Chemicals Mfg. Co., Ltd., Tokyo, Japan

Division of Ser. No. 928,381, Nov. 10, 1986, Pat. No. 4,863,987. This application Nov. 23, 1988, Ser. No. 275,385

Claims priority, application Japan, Apr. 7, 1986, 61-078184; Apr. 7, 1986, 61-078185; Apr. 7, 1986, 61-078186; May 13, 1986, 61-107544

Int. Cl.[5] B32B *5/16*; B65D *85/00*

U.S. Cl. 428—328 **9 Claims**

1. In a deodorizing sheet obtained by coating or impregnating, or coating and impregnating, a base sheet with a deodorizing coating formulation made up of a deodorizing ingredient, a binder resin, and a liquid medium, and then drying the resulting base sheet, the improvement wherein said deodorizing ingredient comprises a zinc compound and an organic acid, wherein zinc compound is at least one member selected from the group consisting of inorganic zinc compounds and organic zinc salts.

4,931,361

CRYOPROTECTIVE REAGENTS IN FREEZE-DRYING MEMBRANES

John D. Baldeschwieler, and Raymond P. Goodrich, Jr., both of Pasadena, Calif., assignors to California Institute of Technology, Pasadena, Calif.

Filed Nov. 18, 1988, Ser. No. 273,952

The portion of the term of this patent subsequent to Apr. 10, 2007, has been disclaimed.

Int. Cl.[5] B01J *13/02*; A61K *37/22, 35/14*

U.S. Cl. 428—402.2 **14 Claims**

1. A composition for the protection of phosphoglyceride-containing biological or synthetic membranes from the disruptive effects of freezing, thawing, or freeze-drying, comprising (a) a compound of the formula

$$R—X—R_1$$

wherein R is a lipid or lipophilic anchor which is suitable for intercalation into and incorporation within a phosphoglyceride layer, X is a hydrophilic linker group, and R_1 is a polyalcohol or carbohydrate group, and (b) ascorbic acid.

4,931,362

MICROCAPSULE AND MICROMATRIX BODIES AND METHOD FOR THEIR FORMATION

Wilhelm Zaifkovits, Korneuburg, Austria; Burghard Grüning, Essen, Fed. Rep. of Germany; Hans-Joachim Kollmeier, Essen, Fed. Rep. of Germany; Dietmar Schaefer, Essen, Fed. Rep. of Germany, and Christian Weitemeyer, Essen, Fed. Rep. of Germany, assignors to F.Joh.Kwizda Gesellschaft m.b.H., Vienna, Austria and TH. Goldschmidt AG, Essen, Fed. Rep. of Germany

Filed Aug. 18, 1988, Ser. No. 233,667

Claims priority, application Austria, Aug. 18, 1987, 2072/87

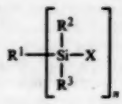
Int. Cl.[5] B01J *13/02*

U.S. Cl. 428—402.22 **26 Claims**

1. A method of forming microcapsules or micromatrix bodies having an interior water-immiscible liquid phase containing an active, water-immiscible ingredient, said method comprising:

(a) dispersing in droplet form an organic phase containing said active ingredient and a component capable of forming a capsule or matrix sheath in an aqueous phase;

(b) said component being an organosilicon compound of the general formula



wherein

R^2 is selected from the group consisting of linear, branched, saturated and unsaturated, n-functional hydrocarbon groups having 2 to 14,000 carbon atoms and such groups interrupted by groups containing oxygen, nitrogen or sulfur;

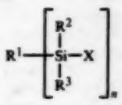
R^2, R^3 are the same or different and represent a hydrocarbon group with 1 to 6 carbon atoms or the X groups;

X is hydroxyl or a hydrolyzable group, and

$n \geq 2$, and

(c) condensing said component to form a cross-linked polymer constituting said capsule or matrix sheath.

17. In a microcapsule or micromatrix body wherein a water-immiscible active ingredient is encapsulated or sheathed by a membrane wall, the improvement which comprises that the membrane wall is a polymer formed by the condensation and cross-linking of an organosilicon compound of the general formula



wherein

R^1 is selected from the group consisting of linear, branched, saturated and unsaturated, n-functional hydrocarbon groups having 2 to 14,000 carbon atoms and such groups interrupted by groups containing oxygen, nitrogen or sulfur;

R^2, R^3 are the same or different and represent a hydrocarbon group with 1 to 6 carbon atoms or the X groups;

X is hydroxyl or a hydrolyzable group, and

$n \geq 2$.

4,931,363

BRAZED THERMALLY-STABLE POLYCRYSTALLINE DIAMOND COMPACT WORKPIECES

David E. Slutz; Paul D. Gigl, both of Worthington; Gary M. Flood, Canal Winchester, and Gary W. Smith, New Albany, all of Ohio, assignors to General Electric Company, Worthington, Ohio

Division of Ser. No. 158,575, Feb. 22, 1988, Pat. No. 4,899,922. This application Jun. 12, 1989, Ser. No. 365,268

Int. Cl.[5] G32B *9/00*

U.S. Cl. 428—408 **8 Claims**

1. A brazed implement comprising a compact of self-bonded diamond particles having a network of interconnected empty pores dispersed throughout the compact bonded to another of said compact or to a cemented carbide substrate by a brazing filler metal disposed therebetween, which brazing metal is an alloy having a liquidus above about 700° C. and containing an effective amount of chromium.

4,931,364

POLYARYLATE-POLYETHYLENE COMPOSITE LAMINATED STRUCTURES

Barry L. Dickinson, Whitehouse Station, N.J., assignor to Amoco Corporation, Chicago, Ill.

Filed May 5, 1988, Ser. No. 190,381
Int. Cl.[5] B32B *27/36*
U.S. Cl. 428—412 14 Claims

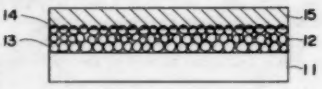
1. A laminated structure comprising a layer of a low density ethylene polymer or copolymer, a tie layer, which is a maleic anhydride or maleic anhydride derivative functionalized polyethylene or polyethylene-vinyl acetate copolymer, and a layer of a polyarylate, wherein the polyarylate is a polyester of a dihydric phenol and an aromatic dicarboxylic acid or a polyarylate copolymer wherein the polyarylate copolymer is a poly(arylate-carbonate) copolymer.

4,931,365

AROMATIC POLYIMIDE FILM HAVING METALLIC SURFACE

Hiroshi Inoue, and Tetsuji Hirano, both of Hirakata, Japan, assignors to Ube Industries, Ltd., Ube, Japan

Filed May 20, 1988, Ser. No. 196,316
Claims priority, application Japan, May 22, 1987, 62-125354
Int. Cl.[5] B32B *15/08, 27/08*
U.S. Cl. 428—458 15 Claims



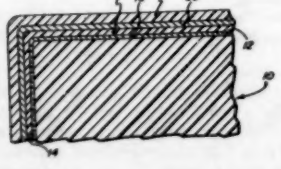
1. An aromatic polyimide film having a metallic surface thereon comprising a substrate film made of an aromatic polyimide containing essentially no inorganic particles, an aromatic polyimide resin layer containing non-conductive metal oxide particles dispersed therein, and a metal layer, superposed in order, wherein said aromatic polyimide resin layer is coated over the substrate film, a portion of said non-conductive metal oxide particles are present on the surface of the aromatic polyimide resin layer on the side in contact with the metal layer in such manner that the top portions of said particles on the surface are exposed and said exposed top portions of the particles are so reduced into metal that the surface of said resin layer is made conductive, and said metal layer is coated over the exposed conductive portions of the particles through an electrolytic process or an electrochemical process.

4,931,366

COATED ARTICLE WITH METALLIC APPEARANCE

Richard L. Mullaney, Jr., Bristol, Conn., assignor to The Stanley Works, New Britain, Conn.

Division of Ser. No. 219,073, Jul. 14, 1988. This application Sep. 5, 1989, Ser. No. 402,466
Int. Cl.[5] B32B *15/08*
U.S. Cl. 428—622 9 Claims



7. An article fabricated from synthetic resin and having a multiplicity of surfaces extending at angles to each other and intersecting, said surfaces being covered with a composite coating which provides a desirable metallic appearance and high resistance to abrasion, chemical attack and corrosion, said composite coating comprising:

(a) a thin metallic deposit of about 100–500 Angstroms in thickness on the surfaces of the article;

(b) a substantially transparent base coating of a cured synthetic resin formulation on said thin metallic deposit, said base coating having a substantially uniform thickness of about 0.0005–0.0015 inch;

(c) a decorative metal layer of about 100–5000 Angstroms in thickness on said base coating, the metal of said metallic deposit and metal layer being the same; and

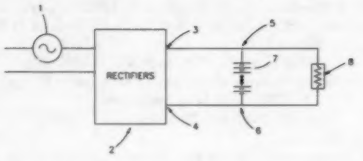
(d) a substantially transparent top coating of a cured synthetic resin formulation on said decorative metal layer, said top coating having a thickness of about 0.0005–0.0020 inch, said composite coating having a thickness of about 0.0018–0.0025 inch, said decorative metal layer being visible through said top coating to provide a desirable metallic appearance, said metallic deposit being visible through both of said resin coatings in the event of a discontinuity in the metallic layer to maintain the uniformity of the metallic appearance, said article, as coated, being free from thermal distortion.

4,931,367

LOW FLOAT TECHNOLOGY BATTERY

William B. Brecht, Hatfield, Pa.; David O. Feder, Madison, N.J.; Joseph M. McAndrews, Freeport, N.Y., and Allan J. Williamson, King of Prussia, Pa., assignors to C & D Charter Power Systems, Inc., Plymouth Meeting, Pa.

Filed Oct. 28, 1988, Ser. No. 264,218
Int. Cl.[5] H01M *10/44*
U.S. Cl. 429—50 45 Claims



1. A method of controlling positive plate grid growth in a floated lead-acid electrochemical cell comprising maintaining the cell at a positive plate polarization of about twenty (20) to about forty (40) millivolts.

4,931,368

VENT LINER AND COVER CONSTRUCTION FOR GALVANIC CELLS

Alan D. Ayers, Brunswick, and John A. Wesner, Avon Lake, both of Ohio, assignors to Eveready Battery Company, St. Louis, Mo.

Continuation of Ser. No. 886,619, Jul. 18, 1986, abandoned. This application Sep. 22, 1987, Ser. No. 102,814
Int. Cl.[5] H01M *2/12*
U.S. Cl. 429—53 19 Claims

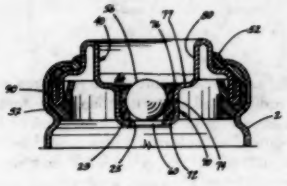
1. An electrochemical cell, comprising:

(a) a cell housing that contains the active components of the cell said cell housing comprising a cell cover closing an opening in the cell housing a vent liner containment section being formed in a part of the cell cover, and the cell cover being formed from a unitary sheet of metallic material by a metal forming process to provide a sealing well;

(b) said vent liner containment section formed in a part of the cell housing that comprises said sealing well which provides a positive stop against which a seal member can be pressed, having a bottom disposed toward the interior of

the cell, and a support ledge at the bottom of the sealing well, said support ledge defining an orifice in said sealing well;

(c) a vent liner, having a vent liner orifice, disposed within the sealing well so that an end of the vent liner abuts the support ledge, the orifice in the sealing well and the vent



liner orifice providing a path from the interior of the cell to the atmosphere; and

(d) a seal member force-fitted within the vent liner, wherein the vent liner and the seal member are adapted so that the member will be at least partially expelled from the vent liner orifice at a predetermined internal gas pressure within the cell.

4,931,369

CONTACT ARRANGEMENT FOR THE BATTERY OF AN IN-EAR HEARING AID

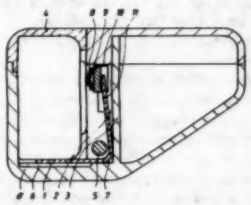
Heinz Hardt, Hirschengasse 9, A-1060 Vienna, and Rudolf Wandle, Jagerstrasse 24, A-1200 Vienna, both of Austria

Filed Sep. 8, 1989, Ser. No. 404,850

Claims priority, application Austria, Sep. 29, 1988, 2404/88

Int. Cl.[5] H01M 2/10

U.S. Cl. 429—98 **12 Claims**



1. In a housing including a cover, the housing and cover defining a battery chamber having an opening closable by the cover, the chamber having dimensions substantially corresponding to the dimensions of a button battery to be received in the chamber through the opening thereof, and the battery having a negative pole and a positive pole: a contact arrangement comprising two contact elements arranged within the battery chamber to contact the battery poles,

(a) one of the contact elements being a pre-tensioned V-shaped spring having two legs arranged to be pressed apart against the tensioning bias of the spring by the battery upon insertion of the battery into the chamber through the opening thereof, one of the spring legs being arranged opposite the opening and biasing the inserted battery into a predetermined position in the chamber, and

(b) the other contact element being arranged in the range of a free end of the other spring leg and insulated therefrom.

4,931,370

COLOR TONER COMPOSITION FOR DEVELOPING ELECTROSTATIC IMAGES

Shiaji Amaya, Saitama; Yoshiyuki Iwanari, Tokyo; Kinji Shinzo, Chiba; Toshiro Kogawara, Saitama; Syuuichi Yamazaki, Saitama; Seiichi Shimizu, Saitama, and Kazuya Kuriyama, Chiba, all of Japan, assignors to Dainippon Ink and Chemicals, Inc., Tokyo, Japan

Filed Dec. 14, 1988, Ser. No. 284,043

Claims priority, application Japan, Dec. 15, 1987, 62-315176; May 30, 1988, 63-130422

Int. Cl.[5] G03G 9/08

U.S. Cl. 430—45 **10 Claims**

1. A positively chargeable color toner composition for developing electrostatic images comprising a coloring agent and a binder resin, wherein the binder resin is a vinyl-modified polyester resin obtained by graft polymerizing:

(a) vinyl monmers containing both an aromatic vinyl monomer and an amino group-containing vinyl monomer onto

(b) an unsaturated polyester comprising at least an aliphatic unsaturated dibasic acid and a polyhydric alcohol and having a weight average molecular weight of 5,000 to 15,000, and the component (b) constituents at least 50% by weight of the vinyl-modified polyester resin and the amino group-containing vinyl monomer constituents 2 to 20% by weight of the vinyl-modified polyester resin.

4,931,371

ELECTROPHOTOGRAPHIC PHOTOSENSITIVE MEMBER

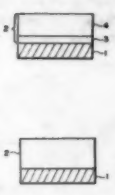
Masakazu Matsumoto; Shozo Ishikawa, both of Yokohama; Wataru Ando, Ibaraki; Toshihiro Kikuchi, Yokohama, and Itaru Yamazaki, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 21, 1988, Ser. No. 274,503

Claims priority, application Japan, Nov. 24, 1987, 62-296443; Nov. 24, 1987, 62-296444; Nov. 24, 1987, 62-296446; Nov. 24, 1987, 62-296447; Nov. 26, 1987, 62-299045

Int. Cl.[5] G03G 5/14, 5/06

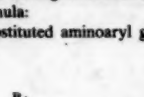
U.S. Cl. 430—59 **17 Claims**



1. An electrophotographic photosensitive member comprising a photosensitive layer on a conductive support, wherein said photosensitive layer contains the following compound, said compound having structures (A) and (B) together in its structural formula:

(A) A disubstituted aminoaryl group represented by Formula (I):

Formula (I)



wherein R_1 and R_2 each is an alkyl group, aryl group or aralkyl group that may have a substituent, or a residual group necessary to form a ring of 5 or 6 members by the

combination of R_1 and R_2, and Ar_1 is an arylene group that may have a substituent;

(B) A (di) sulfide structure selected from the group consisting of (1) to (4):

(1) A chain sulfide structure represented by Formula (II):

Formula (II)

$$—S—R_3$$

wherein R_3 is an alkyl group or aralkyl group that may have a substituent,

(2) A chain disulfide structure represented by Formula (III):

Formula (III)

$$—S—S—R_4$$

wherein R_4 is an alkyl group or aryl group or aralkyl group that may have a substituent,

(3) A chain sulfide structure represented by Formula (IV) and a chain sulfide structure represented by Formula (V):

Formula (IV)

$$—S—R_5$$

wherein R_5 is an aryl group that may have a substituent,

Formula (V)

$$—S—R_6$$

wherein R_6 is an alkyl group, aryl group or aralkyl group that may have a substituent,

(4) A cyclic sulfide structure or cyclic disulfide structure which is a 6- or 7-membered ring containing two or more sulfur atoms.

4. The electrophotographic photosensitive member according to claim 1, wherein the photosensitive layer has a laminated structure comprising a charge generation layer and a charge transport layer.

5. The electrophotographic photosensitive member according to claim 4, wherein the charge transport layer is laminated on the charge generation layer.

6. The electrophotographic photosensitive member according to claim 5, wherein the charge transport layer contains said compound as a charge-transporting material.

4,931,372

POLYCARBONATE-CONTAINING PHOTORECEPTORS CONTAINING A HINDERED PHENOL COMPOUND

Yoshiaki Takei, and Eiichi Sakai, both of Hachioji, Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Oct. 25, 1988, Ser. No. 262,486

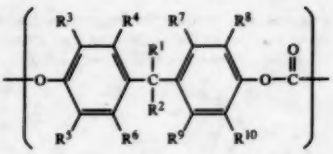
Claims priority, application Japan, Oct. 30, 1987, 62-277070; Oct. 30, 1987, 62-277071

Int. Cl.[5] G03G *5/02*

U.S. Cl. 430—66 **21 Claims**

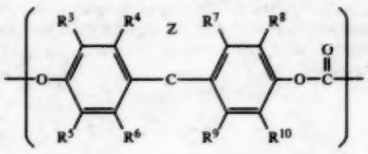
1. An electrophotographic photoreceptor comprising a support having thereon a photoreceptive layer, wherein a surface portion of said layer, which is outermost from the support, contains a polycarbonate having at least one of principal repetition units represented by the following formulas I and II, and a compound having a hindered phenol structual unit in the molecules thereof;

Formula I



wherein R^1 and R^2 each represents a hydrogen atom, a substituted or unsubstituted aliphatic group, a substituted or unsubstituted carbon ring group, or a substituted or unsubstituted aromatic group; and at least either one of R^1 and R^2 is a bulky group; R^3, R^4, R^5, R^6, R^7, R^8, R^9, R^{10} each represents a hydrogenatom, a hydrogen atom, a substituted or unsubstituted aliphatic group, or a substituted or unsubstituted carbon ring group,

Formula II



wherein R^3, R^4, R^5, R^6, R^7, R^8, R^9, R^{10} each represents the same as denoted in the formula I, Z represents a group of atoms necessary for completing a substituted or unsubstituted carbon ring or a sabstituted or unsubstituted heterocyclic ring.

4,931,373

STABLE DNA CONSTRUCTS FOR EXPRESSION OF α-1 ANTITRYPSIN

Glenn Kawasaki, and Leslie Bell, both of Seattle, Wash., assignors to ZymoGenetics, Inc., Seattle, Wash.

Continuation of Ser. No. 614,734, May 25, 1985, abandoned. This application Oct. 22, 1984, Ser. No. 663,315

Int. Cl.[5] C12P *21/00, 21/02;* **C12N** *15/00, 7/00*

U.S. Cl. 435—69.2 **6 Claims**

1. A DNA construct comprising a yeast CDC4 gene which complements a deficiency in a microorganism host cell, said deficiency being in a function necessary for normal cell growth in a complex medium not containing antibiotics or heavy metals and not depleted of specific nutrients, and a DNA sequence coding for alpha-1-antitrypsin, wherein said gene can function as a selectable marker in a host cell transformed with said construct to allow normal growth of said transformed cell in said medium.

4,931,374

ELECTROPHOTOGRAPHIC POSITIVE CHARGING TONER CONTAINING A COPPER PHTHALOCYANINE BLUE PIGMENT

Masami Tomita, Numazu; Toshiyasu Kawabata, Shizuoka; Toshiki Nanya, and Hisao Murayama, both of Numazu, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed May 31, 1985, Ser. No. 739,614

Claims priority, application Japan, Jun. 6, 1984, 59-114442

Int. Cl.[5] G03G *9/08*

U.S. Cl. 430—106 **8 Claims**

1. A toner for developing latent electrostatic images comprising a binder resin and an amount of an ε-type copper phthalocyanine blue pigment said binder and pigment being present in sufficient amounts such that said toner can be used for latent electrostatic image development.

4,931,375

POWDERED ELECTROSTATIC IMAGE DEVELOPING TONER

Kunio Akimoto; Satoru Ikeuchi, and Yoshio Takizawa, all of Hachioji, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 75,094, Jul. 20, 1987, abandoned. This application May 19, 1989, Ser. No. 355,126

Claims priority, application Japan, Jul. 22, 1986, 61-170897

Int. Cl.[5] G03G 9/08

U.S. Cl. 430—109 48 Claims

1. An electrostatic image developing toner, which is a powder under ambient conditions, comprising a colorant, a block copolymer or graft copolymer as a binder component, said block or graft copolymer comprising components taken from the class consisting of 3% to 50% by weight based on said copolymer, of a crystalline polyester, said amorphous vinyl polymer having at least two peaks in its molecular weight distribution curve, one of said peaks being between 100,000 and 1,000,000 and another of said peaks being between 2,000 and 20,000.

4,931,376

CRYSTALLINE TRANS-BUTADIENE POLYMERS

Takeshi Ikematsu, Musashino; Yasuo Hattori, Yokohama; Yoshihiro Inoki, Kawasaki, and Mitsuhiro Tanaka, Yokohama, all of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

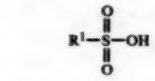
Continuation of Ser. No. 748,555, Jun. 25, 1985, abandoned. This application Jul. 28, 1989, Ser. No. 387,428

Claims priority, application Japan, Jul. 3, 1984, 59-136455; Jul. 6, 1984, 59-138950; Oct. 18, 1984, 59-217296

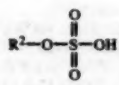
Int. Cl.[5] C08F 36/06

U.S. Cl. 526—164 32 Claims

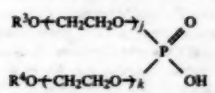
1. A process for producing butadiene polymers, which comprises carrying out polymerization of butadiene monomer or butadiene monomer with another conjugated monomer in the presence of a complexed catalyst, wherein said complexed catalyst is comprised of (a) a salt of a metal consisting of lanthanum or cerium with an organic acid and (b) an organic magnesium compound, wherein the amount of the catalytic component (a) is 0.01 to 1 m mole and the amount of the catalytic component (b) is 0.02 to 1.2 m mole, respectively, per 100 g of the conjugated diene monomer, and further the molar ratio of (a)/(b) is 10/1 to 1/50, the catalyst component (a) being derived from an organic acid of the following formulae (I) to (VI)



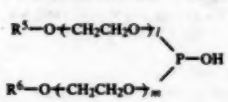
(I)



(II)



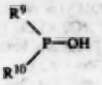
(III)



(IV)

(V)

-continued



(VI)

wherein each of the radicals R^3 to R^6 is an aliphatic hydrocarbon group or an aromatic hydrocarbon group, R^1 is an aromatic hydrocarbon group, R^2 is an aliphatic hydrocarbon group, each of the radicals R^7 to R^{10} is an aliphatic hydrocarbon group, an aromatic hydrocarbon group, an alkoxy group or a phenoxy group, and j, k, l and m are integers of from 1 to 6.

4,931,377

METHOD OF PRODUCING A SELF-SUPPORTING FILM BEARING A POSITIVE PHOTOGRAPHIC IMAGE AND HAVING AN OVERALL THICKNESS OF LESS THAN 50 μM

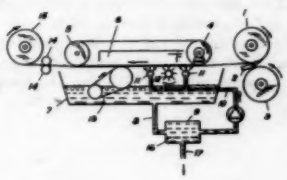
Henriette S. Boogaards-Könnecker, Hageland 22, 4641 RZ Ossendrecht, Netherlands

Continuation of Ser. No. 129,968, Dec. 4, 1987, abandoned, which is a continuation of Ser. No. 828,180, Feb. 11, 1986, abandoned. This application May 3, 1989, Ser. No. 347,250

Claims priority, application European Pat. Off., Aug. 14, 1985, 85201310.1

Int. Cl.[5] G03C 11/12

U.S. Cl. 430—256 8 Claims



1. A method of producing a self-supporting photographic emulsion having a thickness of less than 50 microns and bearing a positive photographic image, the method comprising the following steps:

(a) providing a photographic print having an image part of less than 50 microns in thickness and a backing paper;

(b) dividing the photographic print with the aid of a knife means into an photographic emulsion and backing paper, said divided emulsion retaining particles of said backing paper adhering thereto;

(c) passing the photographic emulsion having an image directed upwardly by conveyor means positioned above the photographic emulsion through vacuum means positioned above said conveyor means for maintaining of the photographic emulsion in a flat position through tank means positioned below said conveyor means and the photographic emulsion, said tank means containing a liquid for removal of particles of the backing paper from the photographic emulsion, whereby said particles are removed;

(d) cutting off untreated edges of the photographic emulsion and

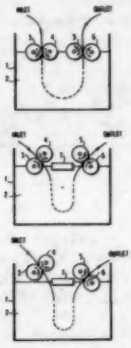
(e) drying the photographic emulsion in drying means.

4,931,378

METHOD OF PROCESSING SILVER HALIDE PHOTOGRAPHIC MATERIALS WHERE THE ROLLERS ARE INTERMITTENTLY ROTATED DURING STAND-BY

Masato Hirano, and Eiichi Tadokoro, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Dec. 5, 1988, Ser. No. 279,897
Claims priority, application Japan, Dec. 3, 1987, 62-306292
Int. Cl.[5] G03C 5/24, 7/16
U.S. Cl. 430—264 7 Claims



1. A method for processing a silver halide photographic material having at least one silver halide emulsion layer on a support and containing at least one hydrazine derivative in said silver halide emulsion layer or in another hydrophilic colloid layer with a roller-conveying type automatic developig machine using a dihydroxybenzene developer containing a sulfite preservative in an amount of 0.15 mol/liter or more at a pH of 10.5 to 12.3, wherein any roller that is in contact with both the developer and air, among the rollers of said developing machine, is continuously rotated at a determined speed during conveyance or processing of the material during a processing phase, and intermittently rotated during a stand-by phase.

4,931,379

HIGH SENSITIVITY RESISTS HAVING AUTODECOMPOSITION TEMPERATURES GREATER THAN ABOUT 160° C.

William R. Brunsvold, Poughkeepsie; Willard E. Conley, Cornwall; Dale M. Crockatt, Somers, all of N.Y., and Nancy E. Iwamoto, Portland, Oreg., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 922,657, Oct. 24, 1986, abandoned. This application Nov. 3, 1988, Ser. No. 267,738
Int. Cl.[5] G03C 1/495, 1/71
U.S. Cl. 430—270 11 Claims

1. A resist comprising at least one polymer copolymer or terpolymer comprising a maleimide or styrene as the polymer backbone having a recurrent acid labile group pendent to the polymer backbone and a photoactive compound capable of generating an acid upon exposure to radiation, wherein the improvement comprises: selecting the acid labile group from carboxylic acid esters wherein the ester portion includes a secondary alkyl substituent side chain on said acid labile group which is capable of forming a secondary carbonium ion intermediate and having an available proton adjacent to the carbonium ion formed during cleavage.

4,931,380

PRE-EXPOSURE METHOD FOR INCREASED SENSITIVITY IN HIGH CONTRAST RESIST DEVELOPMENT OF POSITIVE WORKING DIAZO KETONE PHOTORESIST

Robert A. Owens, E. Amherst; Roland L. Chin, Williamsville; Susan A. Ferguson, W. Seneca, and James M. Lewis, Williamsville, all of N.Y., assignors to MicroSi, Inc., Phoenix, Ariz.

Continuation of Ser. No. 65,680, Jun. 18, 1987, abandoned, which is a continuation of Ser. No. 756,205, Jul. 18, 1985, abandoned. This application Nov. 18, 1988, Ser. No. 274,648
Int. Cl.[5] G03F 7/26
U.S. Cl. 430—296 7 Claims

1. A process for developing a positive photoresist pattern in an ultraviolet (UV) or visible radiation sensitive diazo ketone/-novalac resin photoresist, in a high contrast system, wherein the photoresist comprises a continuous coating on the surface of a supporting substrate, the process comprising:

flood exposing the coating, over the area which is to receive the positive photoresist pattern, with a first predetermined amount of radiation in the UV or visible range or a combination thereof, said first predetermined amount of radiation being insufficient alone to produce more than about 5% film loss with subsequent development of the photoresist;

pattern exposing the coating, over the area which is to receive the positive photoresist pattern, with a second predetermined amount of radiation in the UV or visible range or by electron beam, to form a latent image of the pattern in the photoresist, said second predetermined amount of radiation being insufficient alone to produce more than about 5% film loss with subsequent development of the photoresist, said first and second predetermined amounts of radiation being applied to the coating directly, rather than indirectly via any uncoated surface of the substrate, with the proviso that said first and second predetermined amounts of radiation cumulatively are sufficient to produce significant film loss, and thereby a positive image, in areas irradiation by both said first and second predetermined amounts of radiation; and thereafter

developing the photoresist to remove areas exposed to both said first and second predetermined amounts of radiation with a high contrast aqueous alkaline developer to thereby produce a positive pattern image.

4,931,381

IMAGE REVERSAL NEGATIVE WORKING O-QUINONE DIAZIDE AND CROSS-LINKING COMPOUND CONTAINING PHOTORESIST PROCESS WITH THERMAL CURING TREATMENT

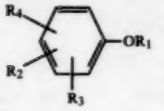
Mark A. Spak, Edison; Donald Mammato, Lebanon; Dana Durham, Bloomsbury, and Sangya Jain, Somerville, all of N.J., assignors to Hoechst Celanese Corporation, Somerville, N.J.

Continuation of Ser. No. 889,032, Jul. 23, 1986, abandoned, which is a continuation-in-part of Ser. No. 764,700, Aug. 12, 1985, abandoned. This application Nov. 8, 1988, Ser. No. 268,640
Int. Cl.[5] G03F 7/26
U.S. Cl. 430—325 16 Claims

1. A process for preparing a negative working photographic element which consists essentially of in order:

(a) forming a composition which consists essentially of in admixture

(i) from about 1% to about 25% based on the weight the solid parts of the composition of a photosensitive compound having the formula



wherein

R_1=1,2 benzoquinone-2-diazide-4-sulfonyl; 1,2 naphthoquinone-2-diazide-4-sulfonyl; or 1,2 anthraquinone-2-diazide-4-sulfonyl

R_2=H, R_7, OR_6 or

R_3=H, R_7, OR_6 or

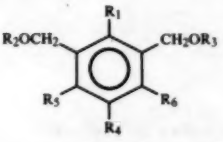
R_4=H, R_7, OR_6 or

R_6=H, alkyl, aryl, aralkyl or R_1

R_7=alkyl, aryl or aralkyl

(ii) from about 75% to about 99% based on the weight of the solid parts of the composition of a novolak resin; and

(iii) from about 0.5% to about 20% based on the weight of the solid parts of the composition of a crosslinking compound which has the formula



wherein R_1, R_4, R_5, R_6 are independently H, (C_1–C_6) alkyl, (C_3–C_6)cycloalkyl, aryl, arylalkyl or OR_2; and R_2, R_3 are independently H, (C_1–C_6) alkyl, (C_3–C_6) cycloalkyl, aryl or arylalkyl; and

(iv) sufficient solvent to dissolve the foregoing composition components; and

(b) coating said composition on a substrate; and

(c) heating said coated substrate at a temperature of from about 20° to about 100° until substantially all of said solvent is dried off; and

(d) imagewise exposing said composition to actinic, electron beam, ion beam or x-ray radiation; and

(e) heating said coated substrate at a temperature of at least about 95° C. to about 160° for from about 10 seconds or more to crosslink said resin; and

(f) removing the radiation unexposed non-image areas of said composition with a developer wherein the process is conducted in the absence of a flood exposure after heating step (e).

4,931,382

SILVER HALIDE COLOR PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL

Masakazu Morigaki; Toshio Kawagishi; Kiyoshi Nakazyo; Nobuo Seto, and Sadao Kamei, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 01,792, Jan. 2, 1987, abandoned, which is a continuation-in-part of Ser. No. 743,206, Jun. 10, 1985, Pat. No. 4,735,893. This application Sep. 12, 1989, Ser. No. 407,675

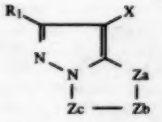
Claims priority, application Japan, Jun. 8, 1984, 59-118414

The portion of the term of this patent subsequent to Apr. 5, 2005, has been disclaimed.

Int. Cl.[5] G03C *1/84, 7/36*

U.S. Cl. 430—512 **23 Claims**

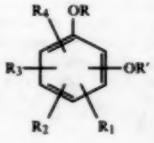
1. A silver halide color photographic light-sensitive material comprising a support having provided thereon at least one layer containing one pyrazoloazole coupler represented by formula (I):



(I)

wherein R_1 represents a hydrogen atom or an organic substituent; X represents a hydrogen atom or a group releasable upon a coupling reaction with an oxidation product of an aromatic primary amine developing agent; Z_a, Z_b and Z_c each represents a methine group, a substituted methine group, =N— or —NH—, with the proviso that the case wherein Z_a and Z_b are nitrogen atoms and Z_c is a methine group or a substituted methine group is excluded; the dotted line represents a single bond or a double bond and one of Z_a—Z_b bond and Z_b—Z_c bond is a double bond and the other is a single bond; when Z_b—Z_c is a carbon-carbon double bond, Z_b—Z_c may be a part of a condensed aromatic ring; when R_1 or X is a divalant group, the compound of the general formula (I) may form a di- or polymer; and when Z_a, Z_b or Z_c is a substituted methine group, the compound of the general formula (I) may form a di- or polymer;

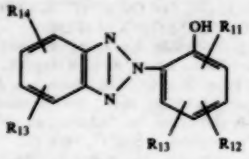
at least one compound represented by the formula (II):



(II)

wherein R and R′, which may be the same or different, each represents an alkyl group; R_1, R_2, R_3 and R_4, which may be the same or different, each represents a hydrogen atom, an alkyl group, an aryl group, an alkoxy group, an alkylthio group, an acylamino group, a hydroxyl group or a halogen atom; at least one of OR and OR′ may be taken together with any of R_1, R_2, R_3 and R_4 that is in an ortho-position to OR or OR′ to form a 5- or 6-membered ring; and at least one of pairs of R_1, R_2, R_3 and R_4, two groups constituting each pair being in an ortho-position to each other, may be taken together to form a 5- or 6-membered ring; and at least one hydrophilic colloidal layer containing at least one benzotriazole compound represented by the formula (III):

(III)



wherein R_{11}, R_{12}, R_{13}, R_{14} and R_{15}, which may be the same or different, each represents a hydrogen atom, a halogen atom, a nitro group, a hydroxyl group, a substituted or unsubstituted alkyl group, a substituted or unsubstituted alkenyl group, a substituted or unsubstituted aryl group, a substituted or unsubstituted alkoxy group, a substituted or unsubstituted acyloxy group, a substituted or unsubstituted aryloxy group, a substituted or unsubstituted alkylthio group, a substituted or unsubstituted arylthio group, a substituted or unsubstituted mono- or dialkylamino group, a substituted or unsubstituted acylamino group or a substituted or unsubstituted 5 or 6-membered heterocyclic group containing at least one of an oxygen or nitrogen atom; and R_{14} and R_{15} may be taken together to form a 5- or 6-membered aromatic ring, said hydrophilic colloidal layer being farther from the support than said layer containing the pyrazoloazole coupler.

4,931,383

SILVER HALIDE PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL

Shuichi Sugita, Hachioji; Satoshi Nakagawa, Sagamihara, and Naoko Shimada, Tokyo, all of Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Aug. 1, 1988, Ser. No. 226,921

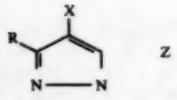
Claims priority, application Japan, Aug. 2, 1987, 62-193136

Int. Cl.[5] G03C *7/38*

U.S. Cl. 430—551 **11 Claims**

1. A silver halide photographic light-sensitive material having at least one silver halide emulsion layer wherein said material comprises at least one coupler represented by the following Formula (M-1) and at least one compound selected from the group consisting of compounds represented by the following Formula (XI) and compounds represented by Formula (XII);

Formula (M-1)



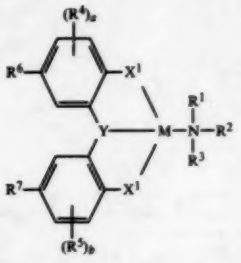
wherein

Z represents a group of non-metal atoms necessary to complete a nitrogen-containing heterocyclic ring which may have a substituent;

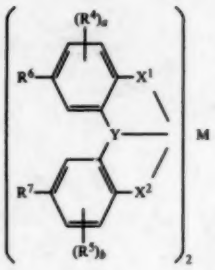
X represents a hydrogen atom or a substituent capable of being split off upon reaction with the oxidized product of a color developing agent; and

R represents a hydrogen atom or a substituent;

Formula (XI)



Formula (XII)



wherein

X^1 is an oxygen, atom, a sulfur atom or an $—NR^{10}—$ in which R^{10} represents a hydrogen atom, an alkyl group, an aryl group or a hydroxyl group;

X^2 represents a hydroxyl group or a mercapto group;

Y represents an oxygen atom or a sulfur atom;

R^1, R^2 and R^3 each represent a hydrogen atom, an alkyl group or an aryl group, respectively, provided that at least two of the groups represented by R^1, R^2 and R^3 are an alkyl group or an aryl group;

R^4 and R^5 each represent a substituent;

R^6 and R^7 each represent a substituent having a σp value of not more than -0.25;

R^4, R^5, R^6 and R^7 adjacent each other may form a ring of five-members or six-members;

M represents a metal atom; and

a and b each represent an integer of 0 to 3.

4,931,384

OPTICAL ASSAY TECHNIQUE

Derek G. Layton, Cambridge; Alan M. Smith; John H. Fisher, both of Royston; Robert M. Pettigrew, Cambridgeshire, and Satham Petty-Saphon, Saffron Waldon, all of England, assignors to Ares-Serono N.V., Geneva, Switzerland

Filed Oct. 17, 1984, Ser. No. 643,141

Claims priority, application United Kingdom, Dec. 21, 1982, 8236333; Jan. 14, 1983, 8301021

Int. Cl.[5] G01N *33/535, 33/553*

U.S. Cl. 435—7 **82 Claims**

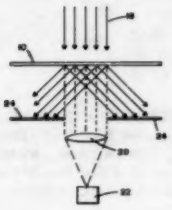
1. An assay technique for qualitative and quantitative detection of a chemical, biochemical or biological species in a sample, which comprises:

(a) coating at least a predetermined part of a surface having a pre-formed regular periodic surface structure provided on a substrate with a thin film of a material capable of binding the species to be assayed, said surface producing a reflective dip with respect to a parameter of incident polarized light;

(b) contacting the coated surface with the sample;

(c) directing polarized light at said coated surface; and

(d) measuring the change in the reflective dip as a result of the binding of the species onto said thin film of material,



whereby a quantitative measure of the species being assayed is provided.

4,931,385

ENZYME IMMUNOASSAYS AND IMMUNOLOGIC REAGENTS

Elliott Block, Wellesley Hills; Izak Bahar, Chestnut Hill; Frank Cole, Stow; Cheryl A. Eaton, Southboro; Wendy Jones, Burlington; Eric Sigillo, Lawrence; Mary Coseo, Arlington; Nancy J. Cicia, Wakefield; L. Edward Cannon, Wayland, and Walter Cantarow, Norwood, all of Mass., assignors to Hygeia Sciences, Incorporated, Newton, Mass.

Continuation of Ser. No. 747,605, Jun. 24, 1985, abandoned, which is a continuation-in-part of Ser. No. 473,907, Mar. 10, 1983, abandoned. This application Nov. 21, 1988, Ser. No. 275,656

Int. Cl.[5] G01N *33/535, 33/543;* C12N *9/96;* C12Q *1/28*

U.S. Cl. 435—7 15 Claims

1. In a lyophilized mixture for use in an enzyme immunoassay, said mixture comprising an antibody-enzyme conjugate and buffer salts, wherein the improvement comprises that said enzyme in said antibody-enzyme conjugate comprises peroxidase and that said lyophilized mixture further comprises:

(a) a binding enhancing agent selected from the group consisting of polyethylene glycol, polyvinyl alcohol, polyvinyl pyrrolidone and dextran;

(b) a water soluble non ionic surfactant, said surfactant being present in the mixture in an amount sufficient to provide an appropriate amount of detergency for said immunoassay without having a deleterious effect on the conjugate; and

(c) a sugar selected from the group consisting of dextrin and trehalose, said sugar being present in the mixture in an amount sufficient to prevent discernible concentration gradients of the components in said mixture;

said lyophilized mixture having the property of preserving the antibody reactivity and the immunologic binding specificity of the antibody-enzyme conjugate even if the mixture is exposed to temperatures between about 80° F. and 120° F. prior to its use in the immunoassay.

4,931,386

METHOD AND COLLAGEN COATED SLIDE FOR ASSAYING COLLAGENASE

Frederick H. Silver, R.D. #1, Box 1128, Echo Lake, Bangor, Pa. 18103, and Ira B. Lamster, 430 Carlton Rd., Wyckoff, N.J. 07841, assignors to Frederick H. Silver, Bangor, Pa. and Ira B. Lamster, Wyckoff, N.J.

Filed Dec. 3, 1987, Ser. No. 128,099

Int. Cl.[5] C12Q *1/38;* C12M *1/00*

U.S. Cl. 435—23 11 Claims

11. A method of preparing a slide for use in an assay of collagenolytic activity consisting essentially of:

(a) blending insoluble collagen with a solution of HCl to form a dispersion, said insoluble collagen consisting of collagen powder which does not pass through sieve openings in excess of 1 micron in diameter, and said blending being carried out gently enough to maintain particle size;

(b) applying said dispersion without an added chemical cross-linking agent to the surface of a slide; and

(c) baking said slide, whereby said collagen is cross-linked and bonded to the surface of said slide, in the absence of an added chemical cross-linking agent.

4,931,387

ANALYSIS IMPLEMENT HAVING AN OXYGEN SUPPLYING LAYER

Yasuo Yamao, Kyoto, and Shigeru Fujioka, Shiga, both of Japan, assignors to Kabushiki Kaisha Kyoto Daiichi Kagaku, Japan

Filed Mar. 20, 1985, Ser. No. 714,185

Claims priority, application Japan, Mar. 30, 1984, 59-64211

Int. Cl.[5] C12Q *1/26*

U.S. Cl. 435—25 1 Claim

1. An analysis implement, comprising:

a support;

a reagent layer containing an oxidase applied to said support such that one surface of said reagent layer is exposed to an air atmosphere; and

a hydrophobic, porous, oxygen permeable layer positioned between said reagent layer and said support, such that oxygen can permeate to said layer containing oxidase from both surfaces of said layer containing oxidase.

4,931,388

RETAINING BIOCATALYST PARTICLES IN A LIQUID MIXTURE

Hermann W. Katinger, Peter-Jordan-Str. 82, 1100 Vienna, Austria

PCT No. PCT/EP87/00125, § 371 Date Nov. 6, 1987, § 102(e) Date Nov. 6, 1987, PCT Pub. No. WO87/05322, PCT Pub. Date Sep. 11, 1987

PCT Filed Mar. 3, 1987, Ser. No. 133,063

Claims priority, application Austria, Mar. 6, 1986, 576/86

Int. Cl.[5] C12P *1/00;* C12N *11/00, 5/02;* C12M *1/40*

U.S. Cl. 435—41 12 Claims

1. A method of treating a liquid mixture containing biocatalyst particles of a predetermined size, the method comprising the steps of:

providing a screen member having a substantially cylindrical screen surface for passing a liquid therethrough in a container containing the liquid mixture, said screen member having an input side for contact with the liquid mixture and an output side defining an inner space of said screen member, the inner space of said screen member defining a column enclosing a portion of said liquid mixture in the container and said screen surface including openings having a passagewidth which is greater than the predetermined size of the biocatalyst particles;

oscillating the screen member in a vertical direction to prevent passage of said particles through the openings therein;

introducing gas into the liquid column enclosed by the screen member on the output side of the screen member; and

providing flow currents to enable mixing the liquid on at least one of the input and output sides of the screen member.

4,931,389

METHOD FOR THE PREPARATION OF MULTIPLE GLUCOSYL BRANCHED-CYCLODEXTRINS

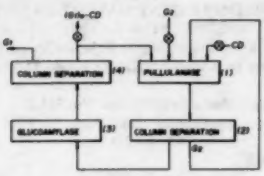
Shoichi Kobayashi, Tsuchiura; Katsuhiko Mikuni, Yokohama; Mitsuru Monma; Toshiya Takano, both of Tsukuba; Kozo Hara, Yokohama, and Hitoshi Hashimoto, Kamakura, all of Japan, assignors to Director of National Food Research Institute, Ministry of Agriculture, Forestry and Fisheries, Ibaraki and Ensuiko Sugar Refining Co., Ltd., Kanagawa, both of, Japan

Filed Aug. 25, 1988, Ser. No. 236,591

Claims priority, application Japan, May 13, 1988, 63-114778

Int. Cl.[5] C12P *19.22, 19/18;* C07G *3/00;* C08B *37/16*

U.S. Cl. 435—95 3 Claims



1. A process for preparing multiple glucosyl branched-cyclodextrins comprising:

contacting a debranching enzyme with a mixture of maltose or maltooligosaccharide which contains maltose and a cyclodextrin to form a branched cyclodextrin;

converting said branched cyclodextrin to glucosyl-cyclodextrin by reaction with glucoamylase;

mixing said glucosyl-cyclodextrin with maltose or maltooligosaccharide which contains maltose;

contacting the resulting mixture with a debranching enzyme and glucoamylase successively to form a multiple glucosyl branched-cyclodextrin.

4,931,390

EXPRESSION OF THE CLONED LYSOSTAPHIN GENE

Paul A. Recsei, New York, N.Y., assignor to Public Health Research Institute of the City of New York, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 852,407, Apr. 16, 1986, abandoned. This application Apr. 10, 1987, Ser. No. 34,464

Int. Cl.[5] C12N *9/00, 21/02, 21/00, 15/00, 1/00, 1/20, 1/16, 1/18;* C07H *21/04*

U.S. Cl. 435—183 23 Claims

1. Recombinant plasmids containing a DNA sequence which codes for lysostaphin and which in transformant microbial hosts will express a gene encoding lysostaphin from *S. simulans* (NRRLB-2628).

4,931,391

METHOD FOR PRESERVATION OF NITRILE HYDRATION ACTIVITY

Kanehiko Enomoto, Tokyo; Koitchiro Ryuno, and Hitoshi Shimizu, both of Yokohama, all of Japan, assignors to Mitsubishi Rayon Kabushiki Kaisha and Nitto Kagaku Kogyo Kabushiki Kaisha, both of Tokyo, Japan

Filed May 1, 1987, Ser. No. 45,869

Claims priority, application Japan, May 2, 1986, 61-101044

Int. Cl.[5] C12N *9/96*

U.S. Cl. 435—188 4 Claims

1. A method for preservation of the nitrile hydration activity of nitrilase produced by a Gram-positive microorganism or of an immobilized form thereof, both having nitrile hydration activity, said method comprising admixing as a stabilizer at least one compound selected from the group consisting of nitriles, amides, and organic acids and salts thereof with a solution or suspension of said nitrilase or of said immobilized form thereof, concentration of the nitrile amide and organic acid or the salt thereof in the solution or suspension being in the range of from 0.1 to 50 g/l, and the microorganism being selected from those of the genera Corynebacterium, Nocardia, Rhodococcus, Bacillus, Bacteridium, and Micrococcus.

4,931,392

PROCESS FOR STABILIZING KINASE

Helmut Rehner, Weilheim; Knut Bartl, Wilzhofen; Peter Stegmüller, Augsburg; Wilhelm Tischer, Peissenberg, and Sibylle Rollinger, Weilheim, all of Fed. Rep. of Germany, assignors to Boehringer Mannheim GmbH, Mannheim, Fed. Rep. of Germany

Continuation of Ser. No. 924,698, Oct. 29, 1986, abandoned. This application May 15, 1989, Ser. No. 355,039

Claims priority, application Fed. Rep. of Germany, Nov. 12, 1985, 3540076

Int. Cl.[5] C12N *9/12;* C12Q *1/50*

U.S. Cl. 435—188 14 Claims

1. A process for stabilizing a liquid form of creatine kinase by disulphide modification comprising reacting creatine kinase in liquid form in any desired sequence:

(a) with a molar excess of disulphide and/or thiosulphonate and

(b) with a molar excess of activated water-soluble carbohydrate as carrier so as to covalently bind said creatine kinase in liquid form to said carrier, wherein said enzyme and said activated water soluble carbohydrate are reacted in a weight ratio of enzyme to carbohydrate of from 1:2 to 1:30.

4,931,393

NON-INFECTIOUS MUTANT CLONE OF HIV

Malcolm A. Martin, Bethesda, Md., and Ronald Willey, Alexandria, Va., assignors to The United States of America as represented by the Department of Health and Human Services, Washington, D.C.

Filed Sep. 14, 1987, Ser. No. 95,837

Int. Cl.[5] C12N *7/00, 15/00;* C07H *15/12*

U.S. Cl. 435—235 2 Claims

1. The clone which is deposited at ATCC under accession number 67467.

4,931,394

VITRO PROPAGATION OF GRAPE VIA LEAF DISK CULTURE

William R. Krul, Narragansett, R.I., assignor to The Board of Governors for Higher Education, State of Rhode Island and Providence Plantations, Providence, R.I.

Continuation of Ser. No. 24,036, Mar. 10, 1987. This application Oct. 31, 1988, Ser. No. 265,215

Int. Cl.[5] C12N *5/00*

U.S. Cl. 435—240.45 6 Claims

1. A method for producing somatic embryos which includes:

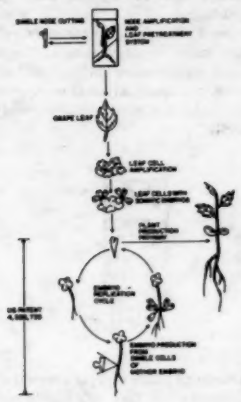
(a) isolating single nodes selected from plants of the cultivar Seyval;

(b) culturing said nodes to develop plantlets;

(c) culturing said plantlets by: exposing the plantlets to alternating photoperiods of light and dark; and

adding effective amounts of growth regulators selected from the group consisting of 6-benzylaminopurine and gibberellic acid A3 to said plantlets during the exposure periods of step (c);

(d) exposing subsequently the plantlets of step (c) to alternate photoperiods of light and dark; and



(e) removing leaf tissue including a portion of the main vein, from the plantlets of step (d) and culturing the same, at least 20% of said leaf tissues producing embryos.

4,931,395

MONOCLONAL ANTIBODY SPECIFIC TO NEUTROPHILS

James D. Griffin, Sherborn, Mass., assignor to Dana-Farber Cancer Institute, Boston, Mass.

Continuation-in-part of Ser. No. 938,864, Dec. 8, 1986, abandoned. This application Jul. 6, 1987, Ser. No. 70,202

Int. Cl.[5] C12N *5/00*; C07K *15/00, 15/04*

U.S. Cl. 435—240.27 **10 Claims**

1. A cell line produced by a hydridoma technique which produces a monoclonal antibody having all of the identifying characteristics of the 1D3 monoclonal antibody which specifically binds to the 1D3 antigen of neutrophils and which does not significantly bind to other human peripheral blood cells and which does not significantly bind to granulocyte precursors in bone marrow, said 1D3 antigen having a molecular weight of approximately 48,000 daltons defined under reducing conditions and a molecular weight in the approximate range of 48,000-60,000 daltons defined under non-reducing conditions.

4,931,396

PTR2030, A CONJUGAL PLASMID AND DERIVATIVES THEREOF THAT CONFER PHAGE REISISTANCE TO GROUP N STREPTOCOCCI

Todd R. Klaenhammer; Rosemary B. Sanozky, both of Raleigh, N.C., and Larry R. Steenson, West Lafayette, Ind., assignors to North Carolina State University, Raleigh, N.C.

Continuation-in-part of Ser. No. 748,444, Jun. 25, 1985, abandoned. This application Oct. 11, 1988, Ser. No. 256,018

Int. Cl.[5] C12N *1/20, 15/00*

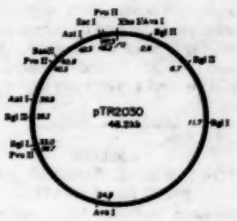
U.S. Cl. 435—252.3 **15 Claims**

1. The plasmid pTR2030 characterized by a molecular weight of 30.0±3.0 megadaltons, having the following sensitivity to restriction endonucleases:

Enzyme	# sites
HindIII	16
HaeIII	4
EcoRI	8
XbaI	5

-continued

Enzyme	# sites
HpaI	3
NcoI	5
AvaI	2



which plasmid encodes for phage resistance phenotype and conjugal transfer phenotype upon expression in group N Streptococci.

4,931,397

METHOD FOR REMOVING ANTIFOAMING AGENTS DURING PROCESSING OF MICROBIAL FERMENTATIONS

Curtis J. Montgomery, Elkhart; Chimanbhai P. Patel, Mishawaka, and Jayarama K. Shetty, Elkhart, all of Ind., assignors to Miles Inc., Elkhart, Ind.

Filed Sep. 24, 1985, Ser. No. 779,504

Int. Cl.[5] C12N *1/00, 9/00, 1/34*

U.S. Cl. 435—243 **22 Claims**

1. In combination with the method of producing an enzyme by the culturing in suitable nutrient growth medium of an enzyme producing microorganism to provide a fermentation broth which contains the enzyme wherein there is added to the fermentation broth a polycationic antifoaming agent, the improvement which comprises:

(a) adding a mineral clay to the fermentation broth after separating biomass therefrom and adjusting the pH to a level at which the clay will not form a complex with the enzyme to form a solid clay/antifoaming agent complex while leaving the enzyme in solution; and

(b) separating the clay/antifoaming agent complex from the fermentation broth by solid/liquid separatory techniques.

4,931,398

BACILLUS SUBTILIS STRAIN AND PREVENTION OF AFLATOXIN CONTAMINATION IN CEREALS AND NUTS

Norio Kimura, Yokohama, Japan, assignor to Morinaga & Co., Ltd., Tokyo, Japan

Filed Jan. 21, 1988, Ser. No. 146,680

Claims priority, application Japan, Feb. 5, 1987, 62-25476; Jun. 23, 1987, 62-155998

Int. Cl.[5] C12N *1/20, 15/00*; A01C *1/00*; A01N *25/00*

U.S. Cl. 435—252.5 **5 Claims**

1. A strain NK-330 of *Bacillus subtilis* accession number FERM BP-1580 or a variant thereof which is capable of inhibiting the growth of aflatoxin-producing fungi as well as their production of aflatoxin.

4,931,399

PROCESS FOR PREPARING OPTICALLY-ACTIVE GLYCEROL KETAL DERIVATIVES

Charles J. Sih, Madison, Wis., assignor to The Wisconsin Alumni Research Foundation, Madison, Wis.

Filed Sep. 9, 1985, Ser. No. 773,493
Int. Cl.[5] C07P *41/00*; C12P *17/04*
U.S. Cl. 435—280 **11 Claims**

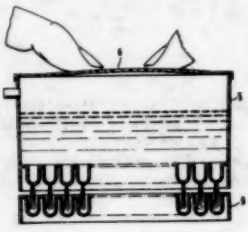
1. A method for resolving racemic 2,3-o-substituted glycerol esters which comprises exposing said esters to the fermentative action of enzymes produced by a microorganism selected from the group consisting of *Streptomyces parvulus* ATCC 19796 and *Micrococcus luteus* ATCC 9341 and recovering optically active 2,3-o-substituted glycerol and optically active 2,3-o-substituted glycerol esters.

4,931,400

DEIVCE FOR POURING WASHING WATER ONTO MUTI-WELL PLATES

Tomofumi Jitsukawa, Saitama, Japan, assignor to Hoechst Japan Limited, Tokyo, Japan

Filed Aug. 19, 1988, Ser. No. 234,045
Claims priority, application Japan, Aug. 22, 1987, 62-127929
Int. Cl.[5] C12M *1/22*
U.S. Cl. 435—287 **5 Claims**



1. A device for forcing liquid into the wells of a multi-well plate, comprising:

a tank having an interior volume for holding a liquid, said tank including a bottom portion having multiple fine orifices spaced for registry with each of said multiple-wells of said plate, a top portion opposite said bottom portion, and side portions connecting said top portion and said bottom portion;

means for supplying liquid to the interior of said tank; and

a pushable surface portion covering a majority of the exterior surface area of said top portion, said pushable surface portion being selectively movable into the interior of said tank for reducing the volume of said tank and thereby forcing liquid contained within said tank through said orifices.

4,931,401

BIOREACTOR

Bechara F. Safi, Cartierville, Canada, assignor to La Societe de Recherche Snc Inc., Canada

Filed Sep. 1, 1988, Ser. No. 239,541
Int. Cl.[5] C12M *1/00*
U.S. Cl. 435—287 **6 Claims**

1. A bioreactor for the biochemical treatment of liquids containing organic matter, comprising:

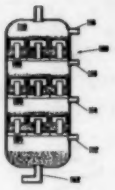
an upstanding container having inlet means for receiving liquid to be treated;

a plurality of vertically spaced plate means extending horizontally in said container defining a plurality of compartments, each said plate means having aperture means therethrough to provide liquid flow communication between adjacent compartments, wherein said aperture means include a series of apertures evenly distributed over the area of said plate means;

a bed of microorganism cells supported on each said plate means and capable of reacting with said organic matter to form a volatile gas;

blockage means in each said compartment extending above said aperture means for preventing said liquid and microorganism cells from passing through said aperture means and returning to a lower adjacent compartment;

an outlet port in each compartment above said bed of microorganism cells;



baffle means mounted under said plate means at said aperture means for limiting the flow of volatile gas to an upper compartment, wherein said baffle means defines a baffle member extending the entire dimension of said plate means;

said member defining a series of openings therein allowing gas to pass through said member and subsequently into a corresponding one of said apertures of said plate means;

the volatile gas deflected by the baffle means exiting through said outlet port of said compartment; and

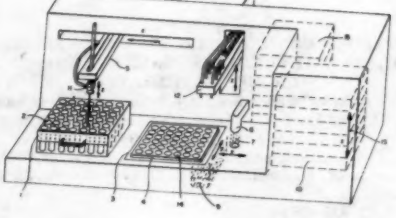
outlet means for discharging treated liquid from said container.

4,931,402

PHOTOMETRIC ANALYSIS EQUIPMENT

Heinz Abplanalp, Hombrechtikon, Switzerland, assignor to Tecan AG Analytische Instrumente, Hombrechtikon, Switzerland

PCT No. PCT/CH87/00022, § 371 Date Oct. 29, 1987, § 102(e) Date Oct. 29, 1987, PCT Pub. No. WO87/05401, PCT Pub. Date Sep. 11, 1987
PCT Filed Feb. 27, 1987, Ser. No. 127,291
Claims priority, application Switzerland, Mar. 6, 1986, 00924/86
Int. Cl.[5] C12M *1/34*
U.S. Cl. 435—291 **7 Claims**



1. Photometric analyzer, in particular for performing enzyme immune tests, characterized by a primary rack for holding a variety of sample tubes;

a work table located alongside the primary rack for supporting a microtitration plate 4 wherein the work table can be positioned in any x/y direction desired in a horizontal plane;

a sample distribution arm which is located above the primary rack and the work table and which can be positioned in any x/y direction in a horizontal plane;

a photometer fixedly located in the positioning sector of the work table whose beam path vertically intersects the x/y plane of the work table; and

a programmable computer for controlling the entire photometric analysis equipment.

4,931,403

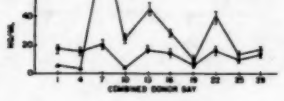
AXILLARY ANDROSTENOL AND DEHYDROEPIANDROSTERONE AS FERTILE PERIOD ONSET INDICATORS

Winnifred B. Cutler, Haverford; George Preti, Horsham, and George R. Huggins, Wallingford, all of Pa., assignors to Monell Chemical Senses Center and University of Pa., both of Philadelphia, Pa.

Division of Ser. No. 5,240, Jan. 20, 1987, Pat. No. 4,879,244, which is a division of Ser. No. 695,053, Jan. 25, 1985, Pat. No. 4,670,401. This application Aug. 7, 1989, Ser. No. 390,156

Int. Cl.[5] G01N *33/48*

U.S. Cl. 436—65 **5 Claims**



1. A birth control method comprising the steps of:

(a) determining the onset of the fertile period of a human female by monitoring the variation in concentration in the axillary secretions of said female of a compound selected from the group consisting of androstenol and a dehydroepiandrosterone, by beginning said monitoring at the cessation of menses until a first significant increase in a concentration of at least one of said compounds indicates the onset of the fertile period; and

(b) causing said human female to avoid exposure to fertilization beginning from about that time until at least about 1 day following the expected time of ovulation;

wherein the menstrual cycle of said human female is adjusted by exposing the nasal region of the female to at least a portion of the axillary secretions of a human donor.

4,931,404

METHOD AND DEVICE FOR KETONE MEASUREMENT

Samar K. Kundu, Libertyville, Ill., assignor to Abbott Laboratories, North Chicago, Ill.

Filed Dec. 22, 1986, Ser. No. 944,793

Int. Cl.[5] G01N *30/00, 33/497*

U.S. Cl. 436—128 **16 Claims**

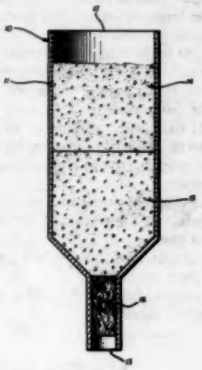
1. A method for the detection of ketone and aldehyde analytes in a fluid sample comprising:

(a) reacting said analytes with a hydrazine compound coupled to an H^+ ion exchange resin to form a colored reaction product,

(b) fluting said reaction product from the ion exchange resin with a solvent, and

(c) detecting the presence of a color signal in the eluted material.

12. A device for the detection of ketone and alkehyde analytes in a fluid sample comprising an H^+ ion exchange resin to



which a hydrazine compound has been coupled, and an adsorbent material.

4,931,405

METHOD FOR MANUFACTURING A SEMICONDUCTOR DEVICE AND SUPPRESSING THE GENERATION OF BULK MICRODEFECTS NEAR THE SUBSTRATE SURFACE LAYER

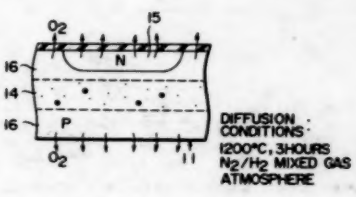
Hiroyuki Kamijo, Yokohama, and Yuuichi Mikata, Kawasaki, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

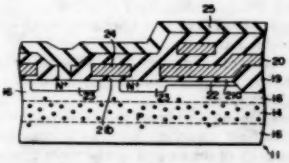
Filed Feb. 6, 1989, Ser. No. 306,716

Claims priority, application Japan, Feb. 8, 1988, 63-26917

Int. Cl.[5] H01L *21/265*

U.S. Cl. 437—12 **4 Claims**





1. A method for manufacturing a semiconductor device having in a semiconductor substrate of one conductivity type a deep island-like diffusion layer of the opposite conductivity type, said method suppressing the generation of bulk microdefects near the substrate surface layer and comprising the steps of:

selectively forming in the semiconductor substrate of one

conductivity type a deep island-like impurity diffusion layer of the opposite conductivity type, including the substeps of,

forming an oxide film on the semiconductor substrate;

forming a resist pattern on the oxide film;

implanting an impurity ion into the substrate at a predetermined location;

forming a well by heating the substrate at a temperature greater than 1100° C. in a gas comprising H_2 and one of N_2, Ar, Ne, He or a mixture thereof; and

removing the oxide film;

forming a field oxide film, serving as an element isolation layer, next to the impurity diffusion layer;

forming a first gate, serving as a capacitor, on the semiconductor substrate;

forming a second gate, serving as a switching transistor, on the semiconductor substrate and connected in parallel with the first gate;

forming an insulation layer for insulating the first gate from the second gate; and

forming a passivation film for protecting an element uppermost on the insulation layer.

4,931,406

METHOD FOR MANUFACTURING SEMICONDUCTOR DEVICES HAVING TWIN WELLS

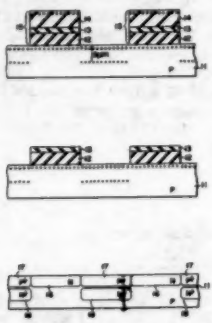
Kazuhiko Tomioka, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Dec. 9, 1988, Ser. No. 282,138

Claims priority, application Japan, Dec. 18, 1987, 62-318649

Int. Cl.[5] H01L *21/265*

U.S. Cl. 437—27 **13 Claims**



1. A method for manufacturing twin well type semiconductor devices having a P-type well and an N-type well comprising the steps of:

forming an insulating layer of a laminated structure having two or more layers on a semiconductor substrate of a first conductivity type;

selectively removing part of said insulating layer to expose a predetermined portion of a surface of said semiconductor substrate;

ion-implanting an impurity of a second conductivity type using said insulating layer as a mask to introduce the impurity of the second conductivity type into the surface of said semiconductor substrate under said insulating layer, thereby forming a first impurity region of the second conductivity type, and into that portion of said semiconductor substrate that is deeper than the surface of said semiconductor substrate and is below said predetermined portion of the substrate surface, thereby forming a second impurity region of the second conductivity type having an impurity concentration higher than that of said first impurity region;

ion-implanting an impurity of the first conductivity type to introduce the impurity of the first conductivity type into said predetermined portion, thereby forming a third impurity region of the first conductivity type;

removing said insulating layer; and

diffusing the introduced first and second impurities by heat treatment to form a first well region of the second conductivity type in the substrate surface under a portion where said insulating layer had been formed, a second well region of the first conductivity type in the predetermined portion of the substrate surface, and an embedded region of the second conductivity type in a lower portion of the predetermined portion, said embedded region having an impurity concentration higher than that of said first well region.

4,931,407

METHOD FOR MANUFACTURING INTEGRATED BIPOLAR AND MOS TRANSISTORS

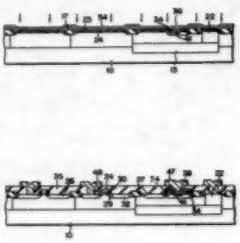
Takeo Maeda, Kawasaki, and Koji Makita, Yokohama, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jun. 24, 1988, Ser. No. 211,010

Claims priority, application Japan, Jun. 25, 1987, 62-156443; Aug. 31, 1987, 62-21666

Int. Cl.[5] H01L *21/265*

U.S. Cl. 437—45 **11 Claims**



1. A method for manufacturing a semiconductor device comprising the steps of:

(a) implanting impurity ions into a channel formation region for forming a MOS transistor with a dummy gate insulating film interposed; and

(b) implanting impurity ions into an internal base formation region for forming a bipolar transistor subsequent to forming a gate insulating film.

7. A method for manufacturing a semiconductor device comprising the steps of:

(a) implanting impurity ions into a MOS transistor formation region in a surface portion of a semiconductor substrate to allow control of a threshold voltage level;

(b) forming a gate electrode over said MOS transistor formation area;

(c) forming source and drain regions of the MOS transistor by implanting impurity ions using said electrode as a mask;

(d) forming an external base region by implanting impurity ions in a bipolar transistor formation area;

(e) forming an internal base region, which contacts said external base region, by implanting impurity ions into said bipolar transistor formation area;

(f) depositing an insulating interlayer on an entire surface of a resultant semiconductor structure;

(g) forming in said insulating interlayer an opening which reaches a surface of said internal base region;

(h) subsequent to depositing a poly-Si layer on an entire surface of the resultant semiconductor structure, leaving a

portion of said poly-Si layer at an area near said opening; and

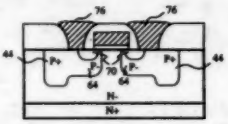
(i) forming an emitter region and an emitter electrode of said bipolar transistor by implanting impurity ions into said internal base region with said poly-Si layer interposed.

4,931,408

METHOD OF FABRICATING A SHORT-CHANNEL LOW VOLTAGE DMOS TRANSISTOR

Fwu-Iuan Hshieh, San Jose, Calif., assignor to Siliconix Incorporated, Santa Clara, Calif.

Filed Oct. 13, 1989, Ser. No. 420,971
Int. Cl.[5] H01L *21/266*
U.S. Cl. 437—44 **5 Claims**



1. A method of forming a DMOS transistor having a short channel comprising the steps of:

forming a gate oxide layer over a surface of a semiconductor material of a first conductivity type;

forming a conductive gate over said gate oxide layer;

forming an oxide sidewall spacer on a sidewall of said gate by forming a first oxide layer over said gate and over a top surface of said semiconductor material and etching said first oxide layer so as to leave said oxide sidewall spacer;

introducing impurities of a second conductivity type into said semiconductor material to form a body region of said second conductivity type while using said gate and said oxide sidewall spacer as a mask to self-align said body region with said gate;

removing said oxide sidewall spacer;

introducing impurities of said first conductivity type into said body region after removal of said sidewall spacer to form a source region of said first conductivity type on and below a surface of said body region while using said gate as a mask to self-align said source region; and

driving in said impurities of a first conductivity type and said impurities of a second conductivity type so as to form a short channel region under said gate.

4,931,409

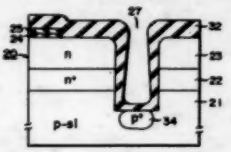
METHOD OF MANUFACTURING SEMICONDUCTOR DEVICE HAVING TRENCH ISOLATION

Hiroomi Nakajima, Yokohama; Nobuyuki Itoh, Tokyo, and Hiroyuki Nihira, Ayase, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jan. 30, 1989, Ser. No. 302,915
Claims priority, application Japan, Jan. 30, 1988, 63-20298; Mar. 31, 1988, 63-78748
Int. Cl.[5] H01L *21/76, 21/302*
U.S. Cl. 437—63 **19 Claims**

1. A method of manufacturing a semiconductor device, comprising the steps of forming a trench in a semiconductor substrate, forming a first film on the surface of said semiconductor substrate including an inner surface of siad trench so as to have a large thickness on the surface of said semiconductor substrate and on an upper portion of a side surface of said trench and to have a small thickness on a bottom portion of said trench, selectively doping an impurity in the bottom portion of said trench through a thin portion of the first film formed on the bottom portion of said trench to form an impurity region on the bottom portion of said trench, removing said first film, and forming a second film having an insulating property on the surface of said semiconductor substrate including the inner surface of said trench.

16. A method of manufacturing a semiconductor device, comprising the steps of forming a trench on a semiconductor substrate, forming a first film on the surface of said semiconductor substrate including an inner surface of said trench so as



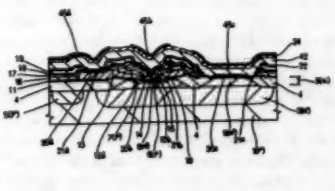
to have a small thickness on an upper corner portion of a side surface of said trench, and to have a large thickness on a bottom corner portion of said trench, etching a surface of said first film entirely or partially to remove said first film, and forming a second film having an insulating property on the surface of said semiconductor substrate including the inner surface of said trench.

4,931,410

PROCESS FOR PRODUCING SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE HAVING COPPER INTERCONNECTIONS AND/OR WIRINGS, AND DEVICE PRODUCED

Takafumi Tokunaga, Tokorozawa; Masatoshi Tsuneoka, Ohme, and Koichiro Mizukami, Akishima, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Aug. 25, 1988, Ser. No. 236,176
Claims priority, application Japan, Aug. 25, 1987, 62-210818
Int. Cl.[5] H01L *27/08*
U.S. Cl. 437—189 **41 Claims**



1. A process for producing a patterned copper layer, comprising the steps of:

(a) forming etching mask and anti-oxidizing layers on a copper layer, such that the anti-oxidizing layer is provided on the copper layer and the etching mask layer is provided on the anti-oxidizing layer;

(b) forming a patterned photoresist layer on said etching mask layer;

(c) etching the etching mask layer using the patterned photoresist layer as a mask, so as to form an etched etching mask layer;

(d) removing the patterned photoresist layer, the copper layer being covered with the anti-oxidizing layer during removal of the patterned photoresist layer;

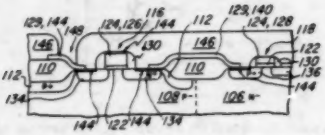
(e) after removing the patterned photoresist layer, etching the anti-oxidizing layer using the etched mask layer as a mask, so as to expose portions of the copper layer; and

(f) etching the exposed portions of the copper layer so as to form the patterned copper layer.

4,931,411
INTEGRATED CIRCUIT PROCESS WITH TIN-GATE TRANSISTOR

Howard L. Tigelaar, Allen; Roger A. Haken, Dallas; Thomas C. Holloway, Dallas, and Robert Groover, III, Dallas, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Division of Ser. No. 938,699, Dec. 5, 1985, Pat. No. 4,814,854. This application Dec. 20, 1988, Ser. No. 287,808
Int. Cl.[5] H01L 21/283
U.S. Cl. 437—192 17 Claims



1. A process for fabricating integrated circuits, comprising the steps of:

(a) providing a substrate having monocrystalline semiconductor portions at least some surface portions thereof, said semiconductor consisting predominantly of silicon:

(b) providing device isolation areas in a predetermined pattern to define separate moat regions in predetermined locations of said monocrystalline semiconductor;

(c) fabricating a first plurality of insulated gate field effect transistors in predetermined locations in said moat regions, gates of said first insulated gate field effect transistors being formed by portions of a first patterned thin film conductive layer:

(d) providing a thin film insulator over at least some parts of said first patterned thin film conductive layer, and also providing a thin film insulator over predetermined locations of a second plurality of insulated gate field effect transistors in respective ones of said moat regions:

(e) depositing a metal consisting substantially of titanium overall;

(f) heating said substrate and said metal in a nitrogen-bearing atmosphere, so that said metal reacts with exposed portions of said substrate to form titanium silicides, and other portions of said metal also react with said nitrogen atmosphere to form a layer having a large fraction of titanium nitride at the surface thereof; and

(g) etching predetermined locations of said titanium nitride layer to provide local interconnection in a predetermined pattern, while also leaving portions of said titanium nitride layer in place over at least some locations of said thin film insulator over said second transistor locations to define gates of said second transistors.

4,931,412
METHOD OF PRODUCING A THIN FILM SOLAR CELL HAVING A N-I-P STRUCTURE

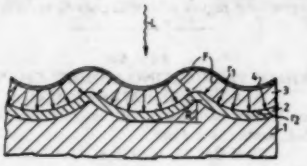
Roland Fischer, Nidderau; Gerhard Grabe, Rossdorf, and Ekkehard Niemann, Maintal, all of Fed. Rep. of Germany, assignors to Licentia Patent-Verwaltungs GmbH, Frankfurt, Fed. Rep. of Germany

Division of Ser. No. 811,639, Dec. 20, 1985, abandoned. This application Jun. 21, 1988, Ser. No. 209,526
Int. Cl.[5] H01L 31/18
U.S. Cl. 437—225 6 Claims

1. A method of producing a solar cell using a substrate material, comprising the steps of:

lapping the substrate material with Al_2O_3 powder having a grain size substantially equal to 3 microns;

abrading the surface of the substrate to obtain a surface roughness of substantially 0.5 to 3 microns; and, subsequently etching the surface of the substrate with hydrofluoric acid for a time period substantially equal to 2 seconds in an ultrasonic bath.



4,931,413
GLASS CERAMIC PRECURSOR COMPOSITIONS CONTAINING TITANIUM DIBORIDE

Richard L. Weir, Mahopac, and Jeannine A. Peasall, Pomona, both of N.Y., assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

PCT No. PCT/US86/02365, § 371 Date Jul. 5, 1988, § 102(e) Date Jul. 5, 1988, PCT Pub. No. WO88/03519, PCT Pub. Date May 19, 1988
PCT Filed Nov. 3, 1986, Ser. No. 220,793
Int. Cl.[5] C03C 6/04
U.S. Cl. 501—31 5 Claims

5. A glass ceramic precursor composition consisting essentially of about 35 percent by weight titanium diboride, about 40 percent colloidal silica and about 25 percent silicon carbide, all by weight, said composition capable of forming a protective coating or sealant enabling a substrate to be used at high temperatures without rapid oxidation.

4,931,414
THERMAL EXTRACTIVE GELATION PROCESS

Thomas E. Wood, and Roger W. Lange, both of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Division of Ser. No. 800,688, Nov. 22, 1985, Pat. No. 4,772,511. This application Jun. 10, 1988, Ser. No. 205,371
Int. Cl.[5] C04B 35/48
U.S. Cl. 501—103 7 Claims

1. A thermal extractive gelation process for making a solid, non-vitreous ceramic article comprising the steps of:

(i) preparing a zirconyl carboxylate-containing precursor mixture having a concentration sufficient to obtain a convenient density and viscosity for forming droplets;

(ii) adding the mixture from step (i), by a means which forms droplets of the mixture, to a liquid extractant at a temperature at which carboxylate is liberated from the zirconyl carboxylate as a carboxylic acid and characterized by:

(a) a substantial solubility, of at least 1 weight percent, for the carboxylic acid at the operating temperature; and

(b) low solubility, of less than 1 weight percent, for the zirconyl carboxylate and other ingredients of the mixture from step (i);

(iii) allowing the droplets to remain in the extractant for sufficient time to form stable gel spheroids;

(iv) separating the gel spheroids from step (iii) from the extractant;

(v) firing the gel spheroids at a temperature in the range of 500°–1350° C.; and

(vi) allowing the fired spheroids from step (v) to cool.

4,931,415
METAL MELTING CRUCIBLE

George W. Neudeck, West Valley, and Paul H. Rieth, Hamburg, both of N.Y., assignors to Ferro Corporation, Cleveland, Ohio

Continuation of Ser. No. 898,230, Aug. 20, 1986, abandoned. This application May 4, 1988, Ser. No. 191,855
Int. Cl.[5] C04B 35/14
U.S. Cl. 501—133 8 Claims

1. A fired, metal melting, clay-bonded graphite crucible for melting metals in a high frequency, induction furnace and having an interior surface, said crucible having the following composition:

	Weight Percent
Fused Silica	3 to 41
Carbon	18 to 36
Crystalline Silica	19 to 26
Alumina	9 to 13
Silicon Carbide	0 to 10
Silicon	0 to 10

the foregoing components totaling 100, as they vary within their respective ranges, said crucible including an applied oxidized coating substantially comprising silica on the interior surface thereof, said coating providing a porous, carbon-free, slightly oxidized layer made from up to 50% silicon metal and up to 60% ball clay on the crucible interior surface which oxidized layer is an integral part of said crucible and which is between about 0.06 inch and 0.25 inch deep.

4,931,416
THALLIUM OR LEAD-CONTAINING MICROPOROUS CRYSTALLINE MATERIALS AND THEIR USE AS DEHYDROGENATION DEHYDROCYCLIZATION AND REFORMING CATALYSTS

Ralph M. Dessau, Edison, N.J., and Ernest W. Valyocsik, Yardley, Pa., assignors to Mobil Oil Corporation, New York, N.Y.

Division of Ser. No. 210,946, Jun. 24, 1988, abandoned. This application Apr. 28, 1989, Ser. No. 346,374
Int. Cl.[5] B01J 29/32
U.S. Cl. 502—74 24 Claims

1. A catalyst comprising a non-acidic composition comprising of

a dehydrogenation metal; and

a non-acidic microporous crystalline material, comprising thallium or lead, wherein thallium or lead is present in an amount which ranges from 0.01 to 20 weight percent, of said material.

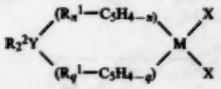
4,931,417
TRANSITION-METAL COMPOUND HAVING A BIS-SUBSTITUTED-CYCLOPENTADIENYL LIGAND OF BRIDGED STRUCTURE

Shinya Miya; Takashi Yoshimura, both of Ichiharashi; Takaya Mise, Kawagoeshi, and Hiroshi Yamazaki, Tokorozawa, all of Japan, assignors to Chisso Corporation, Osaka and The Institute of Physical & Chemical Research, Saitamaken, both of, Japan

Filed Nov. 2, 1988, Ser. No. 266,065
Claims priority, application Japan, Nov. 9, 1987, 62-282538; Jun. 20, 1988, 63-151665; Jun. 20, 1988, 63-151666
Int. Cl.[5] C08F 4/64
U.S. Cl. 502—117 2 Claims

2. A catalyst for producing a stereoregular olefin polymer, which catalyst comprises as its effective components,

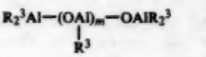
(A) a transition-metal compound expressed by the formula



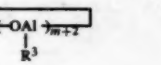
[I]

wherein M represents a transition-metal compound of zirconium or hafnium; Y represents silicon or germanium; R^1_n-C_5H_{4-n} and R^1_q-C_5H_{4-q} each represent an unsubstituted or substituted cyclopentadienyl group; n and q each represent an integer of 0 to 4, but cases of n=q=0 and n=q=4 are excluded; the respective R^1s may be same or different and each represent a silyl group or a hydrocarbon radical, but the site of R^1 on the cyclopentadienyl ring and the kind of R^1 has a configuration wherein any symmetry plane containing M is absent; the respective R^2s may be the same or different and each represent hydrogen atom or a hydrocarbon radical; and the respective Xs may be the same or different and each represent hydrogen atom, a halogen atom or a hydrocarbon radical, and

(B) an aluminoxane expressed by the formula [II] or the formula [III]



[II]



[III]

wherein m represents an integer of 4 to 30 and R^3 represents a hydrocarbon radical.

4,931,418
CATALYST COMPRISING POTASSIUM AND CESIUM PYROSULFATES WITH VANADIUM PENTOXIDE AND ANATASE

Leonard A. Cullo, Hempfield Township, Westmoreland County; Elliott V. Nagle, Jr., Franklin Boro; Edward F. Restelli, Jr., Oakmont Boro, all of Pa., and Thomas J. Yogan, Ft. Mitchell, Ky., assignors to Aristech Chemical Corporation, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 882,874, Jul. 7, 1986, Pat. No. 4,705,770. This application Nov. 9, 1987, Ser. No. 117,872
The portion of the term of this patent subsequent to Nov. 10, 2004, has been disclaimed.
Int. Cl.[5] B01J 27/055, 21/06; C07D 307/89
U.S. Cl. 502—218 8 Claims

1. Method of making a catalyst comprising

A. impregnating an attrition resistant high-silica substrate having a pore volume greater than 0.1 cc/g and a surface are a greater than 10 m^2/g with a solution of an acid salt of titanium, drying the impregnated substrate, heating it to decompose the acid salt of titanium, and calcining the resulting impregnated composition at a temperature of about 450° C. to about 900° C. to obtain a calcined support containing at least about 4% TiO_2, which displays essentially the characteristics of anatase-titania as shown by an X-ray peak at d 3.52,

B. wetting the support obtained thereby with at least one solution containing components including at least one soluble vanadium salt which upon calcination will yield vanadium pentoxide, to impregnate the substrate, based on the total finished composition, with up to about 10% by weight potassium present as potassium pyrosulfate, up to about 12% by weight cesium present as cesium pyrosulfate, up to about 5% sulfuric acid, and from about 0.1 to about 8% vanadium present as vanadium pentoxide, and

C. drying the wet support and calcining it to produce a catalyst with up to 10% by weight potassium as potassium pyrosulfate, up to 12% cesium as cesium pyrosulfate and

from about 0.1 to about 8% vanadium, as vanadium pentoxide.

4,931,419

CATALYST FOR THE CONVERSION OF VEHICULAR EXHAUST GASES AND PROCESS FOR PREPARING THE CATALYST

Gilbert Blanchard, Le Plessis Belleville; Francois Garreau, Paris; Michel Prigent, Rueil Malmaison, and Richard Dozieres, Beynes, all of France, assignors to Pro-Catalyse, Rueil Malmaison Cedex, France

Filed Oct. 21, 1988, Ser. No. 260,718
Claims priority, application France, Oct. 21, 1987, 87 14519
Int. Cl.[5] B01J *23/10, 23/40, 35/04*
U.S. Cl. 502—304 43 Claims

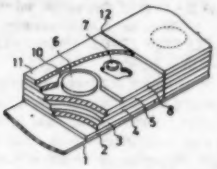
1. A catalyst adapted for the treatment of internal combustion engine exhaust gases, comprising a monolithic catalyst support impregnated with a plurality of catalytically active phases comprising a first catalytically active phase and a second catalytically active phase, one section of said support being impregnated with said first catalytically active phase which includes at least one rare earth and another section of said support being impregnated with said second catalytically active phase which includes at least one rare earth.

4,931,420

TEMPERATURE HISTORY INDICATOR AND ITS MANUFACTURING METHOD

Makoto Asano; Haruki Tsutsumi, both of Yokohama; Eishi Tanaka, Kamakura; Yoshiro Fuseya; Kiyoharu Hasegawa, both of Yokohama, and Hiroyuki Akahori, Yokosuka, all of Japan, assignors to Mitsui Toatsu Chemicals, Inc., Tokyo, Japan

Filed Apr. 29, 1987, Ser. No. 43,745
Claims priority, application Japan, Apr. 30, 1986, 61-97995; Oct. 29, 1986, 61-255727
Int. Cl.[5] B41M *5/22*
U.S. Cl. 503—205 17 Claims



1. A temperature history indicator comprising layers A and B formed on a substrate, said layer A containing either a color developer or a dye-precursor and said layer B containing at least one ink composition which includes either the color developer or the dye-precursor not contained in said layer A and microcapsules enclosing a hydrophobic organic compound which has a predetermined melting point, or said layer B containing at least one ink composition which includes microcapsules enclosing a hydrophobic organic compound in which either the color developer or the dye-precursor not contained in the layer A is dissolved or dispersed and which has a predetermined melting point, characterized in that the ink composition is placed on a limited area in said layer B, and the top of said layer B is covered by a transparent covering layer using a bonding agent, which is placed on a limited area in said layer B to prevent contact with the ink composition.

4,931,421

CATALYST CARRIERS AND A METHOD FOR PRODUCING THE SAME

Motonobu Shibata, 18-86, Andon, Nakanosho-Cho, Inazawa City, Aichi Pref., Japan

Filed Dec. 22, 1988, Ser. No. 288,424
Claims priority, application Japan, Jun. 27, 1988, 63-156829; Jun. 27, 1988, 62-156830
Int. Cl.[5] B01J *32/00*
U.S. Cl. 502—439 21 Claims

1. A method for producing a catalyst carrier, comprising the steps of: preparing a metal strip from a stainless steel or a nickel base alloy at least containing 0.2 to 0.8 wt % of Ti and 0.01 to 0.5 wt % of C; converting the metal strip to a corrugated porous body having gas permeability in at least one direction; coating the entire surface of the porous body with alumina and; forming an alumina thin layer firmly bonded to the surface of the metal strip via Al-O-Ti-C bonds by heat treating the porous body at 600° to 1,000° C. for not less than 10 minutes.

4,931,422

NO-CARBON PRESSURE-SENSITIVE COPYING PAPER

Mamoru Ishiguro, Tokyo, and Akira Kawai, Takasago, both of Japan, assignors to Mitsubishi Paper Mills Limited, Tokyo, Japan

Filed Aug. 17, 1988, Ser. No. 233,002
Claims priority, application Japan, Aug. 19, 1987, 62-207322; Jun. 18, 1988, 63-151023
Int. Cl.[5] B41M *5/16*
U.S. Cl. 503—214 6 Claims

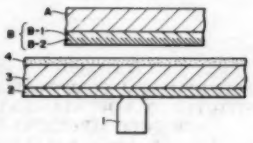
1. A no-carbon pressure-sensitive copying paper comprising a support and coated thereon a coating composition comprising (a) micro-capsules including one or more color forming agents therein, (b) a buffering agent, and (c) a binder, said binder being an alkali thickening copolymer latex.

4,931,423

IMAGE RECEIVING MEDIUM FOR USE WITH SUBLIMATION-TYPE THERMAL IMAGE TRANSFER RECORDING MEDIUM

Hiroyuki Uemura, Numazu; Akira Suzuki, Mishima; Masaru Shimada, Shizuoka, and Hidehiro Mochizuki, Numazu, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Jul. 28, 1989, Ser. No. 386,255
Claims priority, application Japan, Jul. 29, 1988, 63-190051
Int. Cl.[5] B41M *5/035, 5/26*
U.S. Cl. 503—227 9 Claims



1. An image receiving medium for use with a sublimation-type thermal image transfer recording medium comprising:

a substrate; and

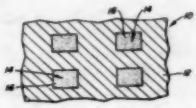
a dye receiving layer formed thereon comprising (1) a resin, as the main component, which can be dyed with a sublimation-type dye, and (2) a silicone oil contained therein in such a fashion that the concentration of said silicone oil increases in the direction of the depth of said dye receiving layer from the bottom thereof adjacent to said substrate toward the upper free surface thereof.

4,931,424

METHOD FOR FORMATION OF HIGH TEMPERATURE SUPERCONDUCTOR FILMS WITH REDUCED SUBSTRATE HEATING

David L. Henty, 650 Town Center Dr., Ste. 1930, Costa Mesa, Calif. 92626

Filed Sep. 4, 1987, Ser. No. 93,304
Int. Cl.[5] H01L *21/263*
U.S. Cl. 505—001 19 Claims



1. A method for forming a film of a ceramic superconductor material of the type requiring a high temperature post-deposition annealing step to form the superconducting phase on a substrate having an upper major surface, comprising the steps:

depositing a layer of reflective material on the upper major surface of said substrate, said reflective material having a higher reflectivity than said superconducting material;

depositing said ceramic superconductor material in a thin on said layer of reflective material; and

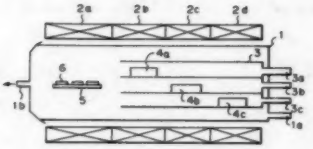
heating said film by application of radiant energy to form a superconducting phase of said ceramic superconductor material.

4,931,425

PROCESS FOR CHEMICAL VAPOR DEPOSITION OF SUPERCONDUCTIVE OXIDE

Takafumi Kimura, Hiratsuka; Hideki Yamawaki, Isehara; Kazuto Ikeda, Atsugi, and Masaru Ihara, Chigasaki, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Sep. 27, 1988, Ser. No. 249,653
Claims priority, application Japan, Oct. 9, 1987, 62-255677; Apr. 8, 1988, 63-087629
Int. Cl.[5] C23C *16/00*; B05D *5/12*
U.S. Cl. 505—1 60 Claims



1. A process for chemical vapor deposition of an oxide superconductive film on a substrate, wherein the substrate is held in a reaction chamber and heated to a first temperature in a range from 750° to 1200° C., said process comprising the steps of:

(a) flowing a mixture of vapors introduced at a position over the substrate in the reaction chamber, said mixture of vapors consisting essentially of a halide of a rare earth metal, one of an alkali earth metal selected from the group consisting of magnesium, calcium, strontium and barium or the corresponding halide thereof, and a halide of copper, at a second temperature equal to or less than the first temperature and being in a range of 700° to 1200° C.; wherein said mixture of vapors introduced into the reaction chamber is formed by:

(b) heating the rare earth metal halide at a temperature of 630° to 750° C. to form a vapor of the rare earth metal halide;

(c) heating the alkali earth metal or alkali earth metal halide at a temperature of 600° to 1100° C. to form a vapor of the alkali earth metal or alkali earth metal halide;

(d) heating the copper halide at a temperature of 300° to 600° C. to form a vapor of the copper halide, the heating temperatures used for vaporizing the components being less than the first temperature;

(e) arranging the three vapor sources of the rare earth metal halide, the alkali earth metal or halide thereof and the copper halide, in a passage such that the copper halide vapor source is the farthest upstream and the vapor source of the alkali earth metal or the halide thereof is the farthest downstream in the passage;

(f) heating the passage increasingly from upstream to downstream to the second temperature;

(g) flowing a carrier gas over the vapor sources in the passage downstream toward the substrate;

(h) introducing an oxygen source gas at position over the substrate in the reaction chamber, the vapor mixture and oxygen oxygen source gas being separated from each other until they approach a point near the substrate at which the vapor mixture and the oxygen source gas come into contact with each other and are heated to the first temperature to cause a reaction between the vapor mixture and the oxygen source gas; and

(i) depositing a superconducting oxide of a rare earth metal-alkali earth metal-copper-oxygen system on the substrate.

4,931,426

PROCESS FOR PREPARING CRYSTALLINE CERAMIC SUPERCONDUCTOR MATERIALS BY FLUIDIZED-BED CALCINATION

Herman C. Mihalich, Newtown, Pa., assignor to Rhone-Poulenc Inc., Princeton, N.J.

Filed May 2, 1988, Ser. No. 188,811
Int. Cl.[5] C22C *29/12*; C23C *8/10*; H01L *39/12*
U.S. Cl. 505—001 10 Claims

1. In the process for preparing crystalline ceramic superconductor materials from

a mixture of ceramic superconductor precursors selected to form upon heat processing a crystalline ceramic superconductor material; the improvement which comprises:

preparing the mixture from solid particulate ceramic superconductor precursors;

subjecting said mixture to calcination at an elevated reaction temperature sufficient to form a crystalline material while

entraining and fluidizing said mixture in a flow of hot calcining gas;

quenching the crystalline ceramic material to below calcination temperature; and annealing and cooling the crystalline ceramic material obtained after quenching in the presence of oxygen to form a superconducting crystalline structure.

4,931,427

PROCESS FOR PRODUCING METAL OXIDE SUPERCONDUCTOR-POLYMER COMPOSITES AND COMPOSITES THEREBY FORMED

James C. W. Chien, Amherst, Mass., assignor to Academy of Applied Science, Inc., Concord, N.H., a part interest

Filed Jan. 15, 1988, Ser. No. 144,525

Int. Cl.[5] **C01B** *13/14;* **C01F** *17/00;* **C01G** *3/02;* **C04B** *35/64*

U.S. Cl. 505—1 **7 Claims**

1. A process for producing copper based metal oxide superconductors having continuous foam-like morphology, that comprises, co-dissolving solutions other than metal oxides containing metal ions with a polymer or copolymer in an organic solvent in which said solutions and polymer or copolymer are soluble and of a polar organic solvent type selected rom the group consisting of dimethyl formamide, dimethacetamide N-methyl pyrolidone and sulfolan, the said polymer or copolymer being selected from the group consisting of (poly)acrylic acid, (poly)methacrylic acid, (poly)styrene sulfonic acid, and copolymers of malonic acid, citraconic acid, acrylonitriles, E-caprolactam, cyclic ethers and cyclic acetals having metal complexing or chelating functional pendant substituents, and a copolymer of vinyl acetate and acrylic acid, and the metals being of the type susceptible of forming high transition temperature metal oxide superconductors with at least some selected from the group consisting of Y, Ba, La and Sr and with the weight ratio of polymer to metal compound being of the order of about two to four-to-one; said process further comprising sequentially driving off the solvent thermally degrading the polymer component of the precursor into volatile fragments, and heating under oxygen to transform the metal compounds into metal oxide superconductors, thereby providing an integral metal oxide superconductor with interconnected substantially uniform size grains extending along the resulting continuous foam-like morphology.

4,931,428

1-TERT-BUTOXY-ω-ALKENES AND THEIR USE AS SCENTS

Rainer Becker, Bad Durkheim; Heinz Eckhardt, Ludwigshafen; Manfred Eggersdorfer, Frankenthal; Gerhard Schindler, Mannheim, and Klaas Jansen, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Apr. 14, 1989, Ser. No. 338,182

Claims priority, application Fed. Rep. of Germany, May 4, 1988, 3815044

Int. Cl.[5] **A61K** *7/46*

U.S. Cl. 512—25 **5 Claims**

1. A 1-tert-butoxy-ω-alkene of the formula I

$$CH_2{=}CH{-}(CH_2{-})_4{-}C(CH_3)_3 \qquad (I)$$

wherein n is an integer of from 4 to 10.

4. A process for imparting fragrance properties to perfumes or to perfumed products, or for improving or modifying the fragrance properties of the said perfumes or products, wherein a 1-tert-butoxy-w-alkene of the formula I

$$CH_2{=}CH{-}(CH_2{-})_nO{-}C(CH_3)_3 \qquad (I)$$

where n is an integer from 4 to 10 is added to these products.

4,931,429

α-AMINOACYL β-AMINOACYL AMINODIOLS AS ANTI-HYPERTENSIVE AGENTS

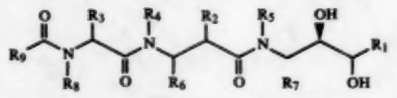
Gunnar J. Hanson, Skokie, and John S. Baran, Winnetka, both of Ill., assignors to G. D. Searle & Co., Chicago, Ill.

Filed Oct. 1, 1987, Ser. No. 103,615

Int. Cl.[5] **C07K** *5/08;* **A61K** *37/00*

U.S. Cl. 514—19 **21 Claims**

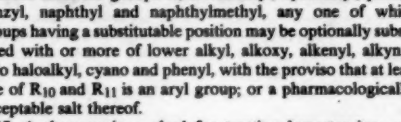
1. A compound of the formula:



wherein R_9 is selected from H, alkyl, alkoxy, alkylamino, benzyloxycarbonyl, phenyl, phenyl substitituted with one or more of halo, methoxy, hydroxy, amino, aminoalkyl, trifluoromethyl and

wherein R_1 is selected from H, linear or branched lower alkyl, haloalkyl, alkylcycloalkyl, alkylcycloalkenyl and alkoxycarbonyl; wherein R_2 is selected from linear or branched lower alkyl, imidazolemethyl and benzyl; wherein R_3 is selected from lower alkyl, loweralkanoylaminoalkyl, benzyl, naphthylmethyl, aryl and benzyl substituted at the phenyl portion by halo or lower alkyl or by both; wherein each of R_4, R_5, R_6 and R_8 is independently selected from H or lower alkyl; wherein R_7 is selected from substituted or unsubstituted cycloalkyl, phenyl, cycloalkylalkyl and phenylalkyl, any one of which may be substituted with one or more groups selected from alkyl, alkoxy, halo, haloalkyl, lower alkenyl, lower alkynyl and cyano; and wherein each of R_{10} and R_{11} is independently selected from the groups H, lower alkyl, cycloalkyl, phenyl, benzyl, naphthyl and naphthylmethyl, any one of which groups having a substitutable position may be optionally substituted with or more of lower alkyl, alkoxy, alkenyl, alkynyl, halo haloalkyl, cyano and phenyl, with the proviso that at least one of R_{10} and R_{11} is an aryl group; or a pharmacologically-acceptable salt thereof.

15. A therapeutic method for treating hypertension, said method comprising administering to a hypertensive patient a therapeutically-effective amount of a compound of the formula:



wherein R_9 is selected from H, alkyl, alkoxy, alkylamino, benzyloxycarbonyl, phenyl, phenyl substituted with one or more of halo, methoxy, hydroxy, amino, aminoalkyl, trifluoromethyl and

wherein R_1 is selected from H, linear or branched lower alkyl, haloalkyl, alkylcycloalkyl, alkylcycloalkenyl and alkoxycarbonyl; wherein R_2 is selected from linear or branched lower alkyl, imidazolemethyl and benzyl; wherein R_3 is selected from

lower alkyl, loweralkanoylaminoalkyl, benzyl, naphthylmethyl, aryl and benzyl substituted at the phenyl portion by halo or lower alkyl or by both; wherein each of R_4, R_5, R_6 and R_8 is independently selected from H or lower alkyl; wherein R_7 is selected from substituted or unsubstituted cycloalkyl, phenyl, cycloalkylalkyl and phenylalkyl, any one of which may be substituted with one or more groups selected from alkyl, alkoxy, halo, haloalkyl, lower alkenyl, lower alkynyl and cyano; and wherein each of R_{10} and R_{11} is independently selected from the groups H, lower alkyl, cycloalkyl, phenyl, benzyl, naphthyl and naphthylmethyl, any one of which groups having a substitutable position may be optionally substituted with or more of lower alkyl, alkoxy, alkenyl, alkynyl, halo, haloalkyl, cyano and phenyl, with the proviso that at least one of R_{10} and R_{11} is an aryl group; or a pharmacologically-acceptable salt thereof.

4,931,430

METHOD FOR PREVENTING OR TREATING ANXIETY EMPLOYING AN ACE INHIBITOR

Abraham Sudilovsky, Lawreaceville, and Zola P. Horovitz, Princeton, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Continuation-in-part of Ser. No. 188,827, May 2, 1988, abandoned, and a continuation-in-part of Ser. No. 132,457, Dec. 14, 1987, abandoned. This application Nov. 14, 1988, Ser. No. 270,872

Int. Cl.[5] A61K *37/02*; C07K *5/06*

U.S. Cl. 514—19 **36 Claims**

1. A method for inhibiting onset of or treating anxiety in a mammalian specie, which comprises administering to a mammalian specie in need of such treatment an anxiolytic effective amount of an angiotensin converting enzyme inhibitor, alone or in combination with a calcium channel blocker.

4,931,431

ARTHRITIS TREATMENT WITH HYPOXANTHINE

William S. Livingston, 1080 Triunfo Canyon Rd., West Lake Village, Calif. 91361

Continuation-in-part of Ser. No. 907,623, Sep. 15, 1986. This application Jun. 2, 1988, Ser. No. 201,641

The portion of the term of this patent subsequent to Aug. 1, 2006, has been disclaimed.

Int. Cl.[5] A61K *31/52*; C07H *19/16*

U.S. Cl. 514—46 **3 Claims**

1. A method for the treatment of mammalian rheumatoid arthritis and osteoarthritis comprising intradermal administration of at least 95% purity in a dosage range of 2×10^{-8} to 2×10^{-7} grams to a mammal in the need of said treatment.

4,931,432

DIETARY VACCINE FOR INHIBITING METABOLISM OF METHANOL

Woodrow C. Monte, 542 W. 16th St., Tempe, Ariz. 85281

Continuation of Ser. No. 47,673, May 6, 1987, Pat. No. 4,834,981. This application Dec. 29, 1988, Ser. No. 290,364

Int. Cl.[5] A61K *31/715*

U.S. Cl. 514—54 **11 Claims**

1. A dietary vaccine introduced in the digestive tract of an individual to inhibit the metabolism of methanol by the human body to form formaldehyde and formic acid, said dietary vaccine comprising, in combination,

(a) at least one source of ethanol selected from the class consisting of ethyl alcohol and a polyethyl compound, said polyethyl compound being obtained by reflexing polygalacturonide and absolute ethyl alcohol; and,

(b) capsule carrier means other than gelatin capsule carrier means for said source of ethanol, said carrier means, when introduced in the digestive tract of a human being, permitting, while said carrier means moves along at least a selected portion of said digestive tract, the continuous release of ethanol from said carrier means into said digestive tract for absorption into the blood system of the individual in minor effective amounts sufficient to

maintain a concentration of ethanol in the blood stream of less than two hundred and fifty parts per million ethanol,

inhibit the metabolism of methanol by the body, and

avoid the intoxication of said individual by said ethanol.

4,931,433

METHOD FOR TREATING CERTAIN NEOPLASTIC DISEASES

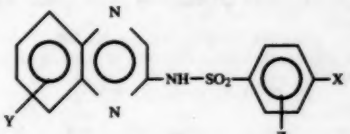
Richard L. Tolman, Warren, N.J., assignor to Merck & Co., Inc., Rahway, N.J.

Filed May 1, 1987, Ser. No. 45,256

Int. Cl.[5] H61K *31/635*

U.S. Cl. 514—157 **3 Claims**

1. A method of treating neoplastic disease sensitive to treatment with the compound below in animals including humans which comprises administering an effective amount of a compound of the formula:



I

wherein:

Y is chloro attached to any of the unsubstituted carbon atoms on the quinoxaline ring;

X is NH_2; and

Z is hydrogen;

to the affected animal.

4,931,434

PENEM COMPOUNDS

Nigel J. P. Broom; Gerald Brooks, both of Betchworth, and Brian P. Clarke, Epsom, all of England, assignors to Beecham Group p.l.c., Brentford, England

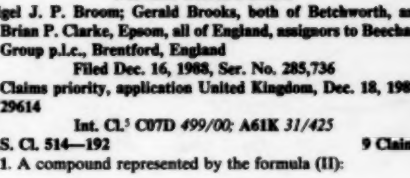
Filed Dec. 16, 1988, Ser. No. 285,736

Claims priority, application United Kingdom, Dec. 18, 1987, 8729614

Int. Cl.[5] C07D *499/00*; A61K *31/425*

U.S. Cl. 514—192 **9 Claims**

1. A compound represented by the formula (II):



(II)

in which

denotes an unsubstituted or substituted nitrogen-containing heterocyclyl group bonded to the remainder of the molecule through a ring nitrogen atom and carrying a positive charge on said nitrogen atom, said nitrogen-containing heterocyclyl group being monocyclic or bicyclic and having up to six ring atoms in the or each ring with up to four hetero-atoms in the or

each ring selected from oxygen, nitrogen and sulfur, there being at least one ring nitrogen, wherein the substitutents for the nitrogen containing heterocyclyl group are selected from one or more of the following groups; unsubstituted or substituted (C_{1-6})alkyl, (C_{2-6})alkenyl, (C_{2-6})alkynyl, (C_{3-7})cycloalkyl, and (C_{3-7})cycloalkyl(C_{1-6})alkyl groups, as well as aryl, aryl(C_{1-6})alkyl, (C_{1-6})alkanoyl, (C_{1-6})alkanoyloxy, heterocyclyl, amino, (C_{1-6})alkanoylamino, (mono or di)-(C_{1-6})alkylamino, hydroxy, (C_{1-6})alkylsulphinyl, (C_{1-6})alkylsulphonyl, heterocyclylthio, arylthio, sulphamoyl, carbamoyl, amidino, guanidino, nitro, halogen, carboxy esters, arylcarbonyl, heterocyclylcarbonyl, (C_{1-6})alkylene and (C_{2-6})alkenylene; and the wavy line denotes either the E- or Z-isomeric position.

4,931,435

AGENT WITH AN ANTIDEPRESSANT ACTIVITY

Erich Lehr, Waldalgesheim, Fed. Rep. of Germany, assignor to Boehringer Ingelheim KG, Ingelheim am Rhein, Fed. Rep. of Germany

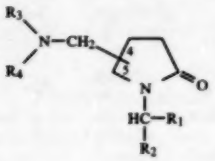
Filed Feb. 26, 1988, Ser. No. 160,730

Claims priority, application Fed. Rep. of Germany, Feb. 27, 1987, 3706399

Int. Cl.[5] **A61K** *27/00, 31/40, 31/55*

U.S. Cl. 514—211 **4 Claims**

1. A pharmaceutical composition of matter comprising an antidepressant of the structural type 10,11-dihydrodibenzo[b,f]-azepine, dibenzo[a,d][1,4] cycloheptadiene or [10,11]-dihydro-dibenzo-[b,f]oxepine or a pharmaceutically acceptable salt thereof and a compound of general formula I



(I)

wherein

R_1 is hydrogen or alkyl,

R_2 is phenyl which may be mono- or di-substituted by alkoxy, fluorine, chlorine, bromine, trifluoromethyl, alkyl, hydroxy, or nitro, or R_2 is pyridyl, and the two groups R_3 and R_4 together with the nitrogen atom may be a saturated 5- or 6-membered ring which contains an O or N atom as a alkyl preferably methyl, or form an imidazole ring, whilst the amino-alkyl group is in the 4- or 5-position, or a pharmacologically acceptable salt thereof.

4,931,436

CONDENSED DIAZEPINONES, PROCESSES FOR PREPARING THEM AND PHARMACEUTICAL COMPOSITIONS CONTAINING THESE COMPOUNDS

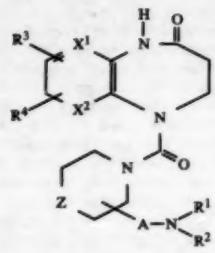
Wolfhard Engel, Biberach; Ganter Trummlitz, Warthausen; Wolfgang Eberlein, Biberach; Gerhard Mihm, Biberach; Norbert Mayer, Biberach, all of Fed. Rep. of Germany; Adriaan De Jonge, Driebergen, Netherlands, and Klaus Rudolf, Biberach, Fed. Rep. of Germany, assignors to Dr. Karl Thomae GmbH, Biberach an der Riss, Fed. Rep. of Germany

Filed Aug. 9, 1988, Ser. No. 230,406

Int. Cl.[5] **A61K** *31/55;* **C07D** *401/06, 405/14*

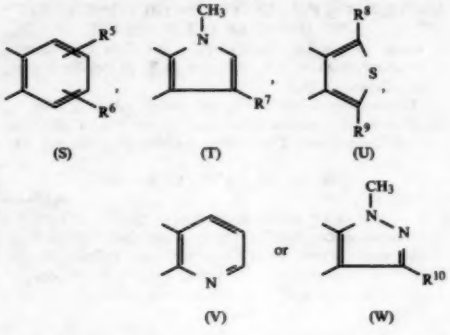
U.S. Cl. 514—220 **6 Claims**

1. A condensed diazepinone of the formula



(I)

wherein B is one of the divalent groups



(S) (T) (U) (V) (W)

X^1 and X^2 are each a =CH— group or, if B is one of the above-mentioned diivalent groups (S), (U) or (W), both X^1 and X^2 or only X^1 or only X^2 may be a nitrogen atom;

A is a straight-chained or branched saturated alkylene group with two to seven carbon atoms which may also be interrupted by an oxygen of sulphur atom or by a methylimino or ethylimino group;

Z is a single bond, an oxygen or sulphur atom or a methylene or 1,2-ethylene group;

R^1 is a branched or unbranched alkyl group with 1 to 4 carbon atoms or a benzyl group;

R^2 is a branched or unbranched alkyl group with 1 to 7 carbon atoms which may optionally also be substituted by a hydroxy group at its 2nd to 7th carbon atom, a cycloalkyl or cycloalkylmethyl group with 3 to 7 carbon atoms in the ring, wherein the cycloalkyl ring may optionally also be substituted by a hydroxy group;

R^1 and R^2 may, however, also form, together with the intermediate nitrogen atom, a 1-piperidinyl, 4-morpholinyl, 2- or 3-hexahydro-1H-1-azepinyl, 1-pyrrolidinyl or 4-methyl-1-piperazinyl group;

R^2 may, however, also be linked to A via an alkylene bridge so that, in conjunction with the group NR^1, a saturated 5-, 6- or 7-membered heterocyclic ring system is produced;

R^3 is an alkyl group with 1 to 4 carbon atoms, a chlorine atom or a hydrogen atom;

R^4 is a hydrogen atom or a methyl group;

R^5 and R^6 are each a hydrogen atom, a fluorine, chlorine or bromine atom or an alkyl group with 1 to 4 carbon atoms;

R^7 is a hydrogen or chlorine atom or a methyl group;

R^8 is a hydrogen atom or an alkyl group with 1 to 4 carbon atoms;

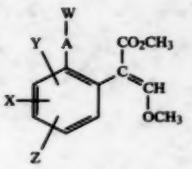
R^9 is a hydrogen or halogen atom or an alkyl group with 1 to 4 carbon atoms and

R^{10} is a hydrogen atom or a methyl group, with the proviso that if B is the divalent group (T) and R^7 is a hydrogen

atom, R^3 can not be a chlorine atom and Z can not be a sulphur atom,

or a pharmaceutically acceptable salt thereof.

6. A method for the treatment of bradycardia or bradyarrhythmia which comprises administering a pharmaceuticallly effective amount of a compound of formula I, as claimed in claim 1,2,3 or 4.



(I)

4,931,437

8-AZAXANTHINE DERIVATIVES, AND PHARMACEUTICAL COMPOSITIONS CONTAINING THEM

Mauro Fedi, Sesto Fiorentino; Carla Bacciarelli, Firenze, and Graziano Bonacchi, Pistoia, all of Italy, assignors to Malesci Istituto Farmacobiologico S.p.A., Firenze, Italy

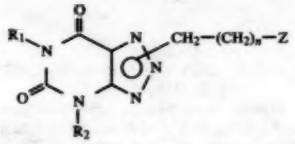
Continuation-in-part of Ser. No. 133,391, Dec. 15, 1987, abandoned. This application Aug. 25, 1988, Ser. No. 236,219

Claims priority, application Italy, Dec. 16, 1986, 48749 A/86

Int. Cl.[5] A61K *31/505*; C07D *471/02*

U.S. Cl. 514—234.2 14 Claims

1. A compound having antiasthmatic activity characterized by the formula



(II)

wherein:

R_1 is a hydrogen or a lower alkyl of from one to six carbon atoms or a phenylmethyl group

R_2 is a lower alkyl of from one to six carbon atoms or a phenyl or a phenylmethyl group

n=from 1 to 3

wherein:

R_3 and R_4 are lower alkyl of one to four carbon atoms or together represent either a saturated aliphatic hydrocarbon chain which with the nitrogen atom forms a five or six member ring or a saturated aliphatic hydrocarbon chain interrupted with oxygen as a heteroatom which with the nitrogen atom forms a five or six member ring;

and wherein the substitution in the triazole ring concerns the 7- or 8- or 9-position, or a physiologically acceptable salt thereof.

4,931,438

FUNGICIDES

John M. Clough, Buckinghamshire, and Christopher R. A. Godfrey, Berkshire, both of England, assignors to Imperial Chemical Industries PLC, London, England

Division of Ser. No. 85,412, Aug. 14, 1987, Pat. No. 4,870,075. This application Jun. 22, 1989, Ser. No. 369,834

Claims priority, application United Kingdom, Aug. 20, 1986, 8620251

Int. Cl.[5] C07D *253/06, 253.04*; A01N *43/66, 43/707*

U.S. Cl. 514—241 10 Claims

1. A compound having the formula (I):

(I)

and stereoisomers thereof, wherein X, Y, and Z, which are the same or different, are hydrogen, halogen, hydroxy, C_{1-6} alkyl, C_{2-6} alkenyl optionally substituted with phenyl, furyl, thienyl or pyridyl, phenyl, C_{2-6} alkynyl optionally substituted with phenyl, C_{1-6} alkoxy, phenoxy, phenyl(C_{1-6})alkyl, phenyl(C_{1-6})alkoxy, phenoxy(C_{1-6})alkyl, C_{1-6} alkanoyl, benzoyl, amino, C_{1-6} alkanoylamino, benzoylamino, furoylamino, thienylcarbonylamino, nitro, cyano, $—CO_2R^1$, $—CONR^2R^3$ or $—COR^4$, the alkyl moieties of any of the foregoing groups being optionally substituted with hydroxy, halogen, C_{1-4} alkoxy or C_{1-4} alkoxycarbonyl, the phenyl or heterocyclic moieties of any of the foregoing groups being optionally substituted with one or more of halogen, hydroxy, C_{1-4} alkyl, C_{1-4} alkoxy, trifluoromethyl, trifluoromethoxy, phenoxy, benzyloxy, nitro, amino, phenyl, carboxy, C_{1-6} alkoxycarbonyl, cyano, C_{1-6} alkylcarbonylamino or methylenedioxy and any of the foregoing amino moieties being optionally substituted with N-phenyl or N—C_{1-6} alkyl; W is C-linked triazinyl or 1,2,4-benzotriazinyl-3-yl optionally substituted, in one or both rings in the case of 1,2,4-benzotriazin-3-yl, with one or more of

halogen,

nitro,

C_{1-4} alkyl which is itself optionally substituted with halogen, hydroxy or C_{1-4} alkoxy,

C_{1-4} alkoxy which is itself optionally substituted with halogen, hydroxy or C_{1-4} alkoxy,

phenoxy which is itself optionally substituted with halogen, hydroxy,

amino which is itself optionally substituted with C_{1-4} alkyl or cyano;

A is oxygen or sulphur; and R^1, R^2, R^3, and R^4, which are the same or different, are hydrogen, C_{1-6} alkyl, C_{3-6} cycloalkyl, C_{3-6} cycloalkyl(C_{1-6})alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, phenyl or phenyl(C_{1-6})alkyl, in which the phenyl moieties are optionally substituted as defined above.

9. A fungicidal composition comprising, as an active ingredient, a compound according to claim 1 together with a fungicidally acceptable carrier or diluent therefor.

4,931,439

PESTICIDES

Haukur Kristinsson, Basel, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

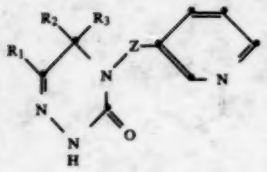
Filed Oct. 11, 1988, Ser. No. 255,684

Claims priority, application Switzerland, Oct. 16, 1987, 4062/87

Int. Cl.[5] A01N *43/707*; C07D *253/06, 253/08*

U.S. Cl. 514—242 14 Claims

8. A method of controlling pests selected from insects and arachids in and on animals and plants, which comprises bringing the pests in their various stages of development into contact with a compound of formula I



(I)

wherein

R_1 is hydrogen, C_1–C_{12}alkyl, C_3–C_6cycloalkyl, C_1–C_4alkoxy-C_1–C_6alkyl, C_1–C_2haloalkyl, phenyl, benzyl, phenethyl, phenpropyl, phenbutyl or phenpentyl, or a phenyl, benzyl, phenethyl, phenpropyl, phenbutyl or phenpentyl radical that is mono- di-substituted by halogen, C_1–C_5alkyl, C_1–C_2-haloalkyl, methoxy and/or by ethoxy,

R_2 is hydrogen, C_1–C_6alkyl or C_3–C_6cycloalkyl, or is phenyl that is unsubstituted or substituted by C_1–C_{12}alkyl, halogen or by C_1–C_{12}haloalkyl, or R_1 and R_2 together form a saturated or unsaturated 3- to 7-membered carbocycle,

R_3 is hydrogen or C_1–C_6alkyl and

Z is — N=CH— or — NH— CH_2—,

or with a salt thereof with an organic or inorganic acid.

4,931,440

URICOSURIC COMPOSITION

Mitsuyoshi Nakashima, Hamamatsu; Mitsutaka Kanamaru, Nagoya; Akira Sugiyama, Ikoma, and Masato Terakawa, Nara, all of Japan, assignors to Fujisawa Pharmaceutical Company, Ltd., Osaka, Japan

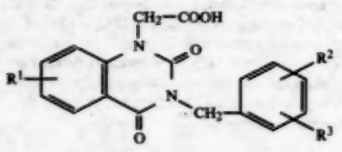
Filed Jul. 20, 1988, Ser. No. 221,654

Claims priority, application Japan, Jul. 29, 1987, 62-189822

Int. Cl.[5] A61K *31/505*

U.S. Cl. 514—259 **3 Claims**

1. A method for treating gout which comprises administering a uricosuric effective amount of a quinazoline derivative of the general formula:



wherein R^1, R^2 and R^3 each is a hydrogen atom or a halogen atom or a pharmaceutically acceptable salt thereof a human being in need thereof.

4,931,441

STABILIZED AQUEOUS LEUCOVORIN CALCIUM COMPOSITIONS

Richard P. Lawrence, Sayville, N.Y., assignor to Luitpold Pharmaceuticals, Inc., Shirley, N.Y.

Filed Nov. 9, 1988, Ser. No. 269,130

Int. Cl.[5] A61K *31/50, 31/495*

U.S. Cl. 514—249 **13 Claims**

1. A leucovorin calcium composition comprising an aqueous solution of leucovorin calcium pentahydrate in the amount of about 6.35 mg per mL of solution, said solution being adjusted to a pH in the range 6.5–8.5 by the addition of sodium hydroxide and/or citric acid and 14 comprising sodium citrate or sodium citrate dihydrate as a stabilizing and buffering agent.

4,931,442

STABILIZED AQUEOUS FOLIC ACID PREPARATION

Holger Blum, Parkallee 75, D-2000 Hamburg 13, Fed. Rep. of Germany

Filed Dec. 6, 1988, Ser. No. 280,351

Claims priority, application European Pat. Off., Dec. 7, 1987, 87118082.4

Int. Cl.[5] A61K *31/505*

U.S. Cl. 514—249 **5 Claims**

1. A stabilized aqueous folic acid preparation comprising a folic acid component selected from the group consisting of folic acid, ammonium, alkali metal, magnesium, calcium, and strontium salts thereof, and mixtures thereof, which has improved stability of its folic acid contents in the presence of oxygen, the said preparation containing as a stabilizer of said folic acid a combination of

(a) at least one member selected from the group consisting of dihydrofolic acid and ammonium, alkali metal, magnesium, calcium, strontium, and lower alkanolammonium salts thereof, and

(b) at least one member selected from the group consisting of citric acid, tartaric acid and malic acid and ammonium, alkali metal, magnesium, calcium, strontium and lower alkanolammonium salts thereof.

4,931,443

PIPERAZINE COMPOUND AND PHARMACEUTICAL USE THEREOF

Toru Nakao, Nakatsu; Kenji Morita, Kiyose; Minoru Obata, and Yasuto Morimoto, both of Nakatsu, all of Japan, assignors to Yoshitomi Pharmaceutical Industries, Ltd., Osaka, Japan

PCT No. PCT/JP87/00817, § 371 Date Jun. 24, 1988, § 102(e) Date Jun. 24, 1988, PCT Pub. No. WO88/03136, PCT Pub. Date May 5, 1988

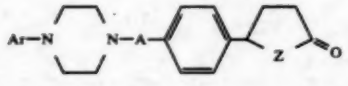
PCT Filed Oct. 22, 1987, Ser. No. 219,543

Claims priority, application Japan, Oct. 27, 1986, 61-256446

Int. Cl.[5] A61K *31/495; C07D 403/10, 403/14*

U.S. Cl. 514—252 **3 Claims**

1. A piperazine compound represented by the formula:



wherein Ar represents phenyl or phenyl having a substituent selected from the group consisting of halogen, lower alkyl and trifluoromethyl; A represent lower alkylene; and Z represents —NR— wherein R represents a hydrogen atom, or a pharmaceutically acceptable acid addition salt thereof.

4,931,444

5-LIPOXYGENASE INHIBITING 4-(4-PHENYL-1-PIPERAZINYL)PHENOLS

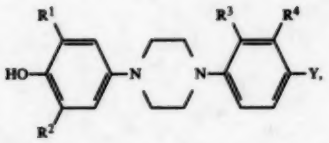
Jean P. F. Van Wauwe, Beerse; Jan Heeres, Vosselaar, and Leo J. J. Backx, Arendonk, all of Belgium, assignors to Janssen Pharmaceutica N.V., Beerse, Belgium

Continuation-in-part of Ser. No. 161,825, Feb. 29, 1980, abandoned. This application Jan. 12, 1989, Ser. No. 297,010

Int. Cl.[5] A61K *31/495; C07D 403/10, 413/10, 417/10*

U.S. Cl. 514—252 **12 Claims**

1. A method of treating warm-blooded animals suffering from leukotriene-mediated diseases and disorders by administering an effective 5-lipoxygenase inhibiting amount of a compound of formula



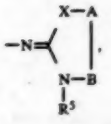
(I)

a pharmaceutically acceptable acid addition salt thereof or a stereochemically isomeric form thereof, wherein

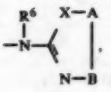
R^1 and R^2 each independently are hydrogen, C_{1-6}alkyl or halo;

R^3 and R^4 each independently are hydrogen, halo, amino, nitro or trifluoromethyl;

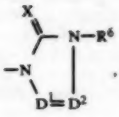
Y is hydrogen, nitro, amino, mono- or di(C_{1-6}alkyl)amino, C_{1-6}alkylcarbonylamino, C_{1-6}alkyl, C_{1-6}alkylcarbonyl, hydroxy, halo, mono- or di-(C_{1-6}alkyl)aminosulfonyl or a hetercyclic radical of formula



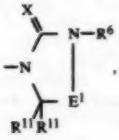
(a)



(b)



(c)



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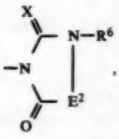
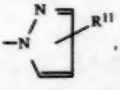


(e)

(f)



(g)

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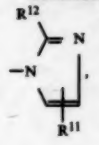
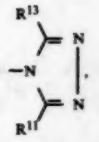


(h)



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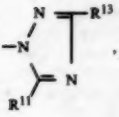
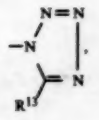


(j)



(k)

X is oxygen or sulfur;

R^5 and R^6 each independently are C_{1-6}alkyl, C_{3-6}alkenyl, C_{3-6}alkynyl, aryl, (aryl)C_{1-6}alkyl, C_{3-7}cycloalkyl, (C_{3-7}cycloalkyl)C_{1-6}alkyl, C_{1-6}alkyloxyC_{1-6}alkyl, mono-, di- or trihaloC_{1-6}alkyl; said C_{1-6}alkyl, C_{3-7}cycloalkyl, (C_{3-7}cycloalkyl)C_{1-6}alkyl and (aryl)C_{1-6}alkyl being optionally substituted with oxo or hydroxy on any carbon atom of the C_{1-6}alkyl or C_{3-7}cycloalkyl moiety, provided that said carbon atom is not adjacent to the nitrogen atom bearing said R^5 or R^6 radical; and R^6 may also be hydrogen;

A is $-C(R^7)(R^8)-$ and B is $-CH_2-$ or $-CH_2-CH_2-$, or A and B taken together form a bivalent radical of formula $-CH=CH-$ (l) or $-CH=N-$ (m), wherein the carbon atom of said radical is connected to X;

R^7 and R^8 each independently are hydrogen or C_{1-6}alkyl and R^7 may also be C_{1-6}alkyloxy; and in each of the bivalent radicals —B—, $-CH=CH-$ (l) and $-CH=N-$ (m) one or where possible two hydrogen atoms may be replaced by C_{1-6}alkyl or aryl; and in the bivalent radical B, two geminal hydrogen atoms may also be replaced by C_{4-6}alkanediyl optionally substituted with one or two C_{1-6}alkyl radicals;

D^1 is $-N=$ or $-CH=$; and

D^2 is $=N-$, $=CH-$ or $=CH-C(=O)-$;

E^1 is $-CH_2-$, $-CH_2-CH_2-$ or $-C(=O)-$;

E^2 is $-C(R^9)(R^{10})-$ or $-NR^{11}-C(=O)-$ wherein the carbonyl of said radical is connected to NR^6;

R^9 and R^{10} are each independently hydrogen or C_{1-6}alkyl; or R^9 and R^{10} taken together may form a bivalent C_{4-6}alkanediyl radical optionally substituted with one or two C_{1-6}alkyl radicals; or R^6 and R^9 taken together may form a bivalent C_{3-6}alkanediyl radical optionally substituted with one or two C_{1-6}alkyl radicals; and in each of the bivalent radicals D^1, D^2 and E^1, one or where possible two hydrogen atoms may be replaced by C_{1-6}alkyl;

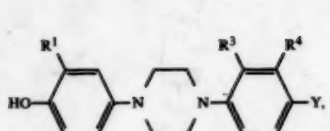
each R^{11} independently is hydrogen or C_{1-6}alkyl;

R^{12} is hydrogen, C_{1-6}alkyl or C_{1-6}alkylthio;

R^{13} is hydrogen or C_{1-6}alkylthio; and

aryl is phenyl optionally substituted with one to three radicals independently selected from halo, C_{1-6}alkyl, C_{1-6}alkyloxy, hydroxy or mono-, di- or trihaloC_{1-6}alkyl.

10. A compound of the formula:

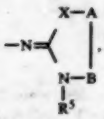

(I)

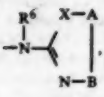
a pharmaceutically acceptable acid addition salt thereof or a sterochemically isomeric form thereof, wherein:

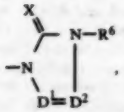
R^1 and R^2 each independently are hydrogen, C_{1-6}alkyl, or halo;

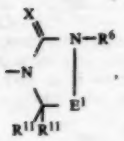
R^3 and R^4 each independently are hydrogen, halo, amino, nitro, or trifluoromethyl;

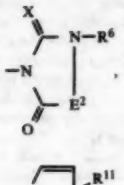
Y is hydrogen, nitro, amino, mono- or di(C_{1-6}alkyl)amino, C_{1-6}alkylcarbonylamino, C_{1-6}alkyl, C_{1-6}alkylcarbonyl, hydroxy, halo, mono- or di(C_{1-6}alkyl)aminosulfonyl, or a heterocyclic radical selected from a radical of the formula:


(a)

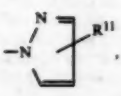

(b)


(c)


(d)


(e)

(f)


(g)

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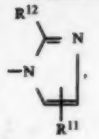
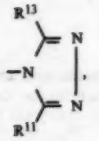
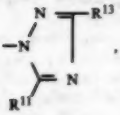

(h)


(i)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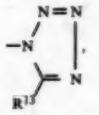

(k)

wherein:

X is oxygen or sulfur;

R^5 and R^6 each independently are C_{1-6}alkyl, C_{3-6}alkenyl, C_{3-6}alkynyl, aryl, (aryl)C_{1-6}alkyl, C_{3-7}cycloalkyl, (C_{3-7}cycloalkyl)C_{1-6}alkyl, C_{1-6}alkyloxyC_{1-6}alkyl, mono-, di-, or trihaloC_{1-6}alkyl; said C_{1-6}alkyl, C_{3-7}cycloalkyl, (C_{3-7}cycloalkyl)C_{1-6}alkyl, and (aryl)C_{1-6}alkyl being optionally substituted with oxo or hydroxy on any carbon atom of the C_{1-6}alkyl or C_{3-7}cycloalkyl moiety, provided that said carbon atom is not adjacent to the nitrogen atom bearing said R^5 or R^6 radical; and R^6 may also be hydrogen;

A is $-C(R^7)(R^8)-$ and B is $-CH_2-$ or $-CH_2-CH_2-$, or A and B taken together form a bivalent radical of the formula $-CH=CH-$ (l) or $-CH=N-$ (m), wherein the carbon atom of said bivalent radical is connected to X;

R^7 and R^8 each independently are hydrogen or C_{1-6}alkyl and R^7 may also be C_{1-6}alkyloxy; and in each of the bivalent radicals —B—, $-CH=CH-$ (l), and $-CH=N-$ (m) one or where possible two hydrogen atoms may be replaced by C_{1-6}alkyl or aryl; and in the bivalent radical B, two geminal hydrogen atoms may also be replaced by C_{4-6}alkanediyl optionally substituted with one or two C_{1-6}alkyl radicals;

D^1 is $-N=$ or $-CH=$;

D^2 is $=N-$, $=CH-$, or $=CH-C(=O)-$;

E^1 is $-CH_2-$, $-CH_2-CH_2-$, or $-C(=O)-$;

E^2 is $-C(R^9)(R^{10})-$ or $-NR^{11}-C(=O)-$ wherein the carbonyl of said radical is connected to NR^6;

R^9 and R^{10} are each independently hydrogen or C_{1-6}alkyl; or R^9 and R^{10} taken together may form a bivalent C_{4-6}alkanediyl radical optionally substituted with one or two C_{1-6}alkyl radicals; or R^6 and R^9 taken together may form a bivalent C_{3-5}alkanediyl radical optionally substituted with one or two C_{1-6}alkyl radicals; and in each of the bivalent radicals D^1, D^2, and E^1, one or where possible two hydrogen atoms may be replaced by C_{1-6}alkyl;

each R^{11} independently is hydrogen C_{1-6}alkyl;

R^{12} is hydrogen, C_{1-6}alkyl, or C_{1-6}alkylthio; and

R^{13} is hydrogen or C_{1-6}alkylthio,

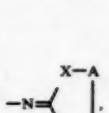
wherein aryl is phenyl optionally substituted with one to three radicals independently selected from halo, C_{1-6}alkyl, C_{1-6}alkyloxy, hydroxy, or mono-, di- or trihaloC_{1-6}alkyl,

and wherein:

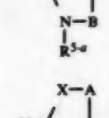
at least one of R^1 or R^2 is C_{1-6}alkyl or halo; or

at least one of R^3 or R^4 is halo, amino, nitro, or trifluoromethyl; or

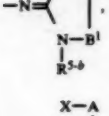
Y is mono- or di(C_{1-6}alkyl)amino, (C_{1-6}alkyl)carbonylamino, C_{1-6}alkyl, C_{1-6}alkylcarbonyl, halo, mono- or di(C_{1-6}alkyl-)aminosulfonyl, or a radical selected from radicals of the formula:



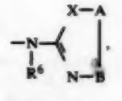
(a-1)



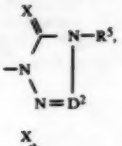
(a-2)



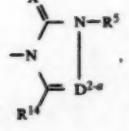
(b)



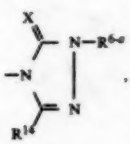
(c-1)



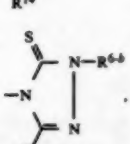
(c-2)



(c-3)



(c-4)



(d-1)

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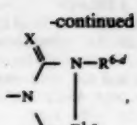
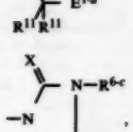
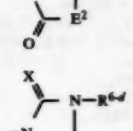


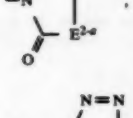
(d-2)



(e-1)



(e-2)



(k-1)

wherein:

R^{5-a} is a mono-, di-, or trihaloC_{1-6}alkyl; or a C_7cycloalkyl or (C_7cycloalkyl)C_{1-6}alkyl, both being optionally substituted with oxo or hydroxy on the C_{1-6}alkyl or C_7cycloalkyl moiety;

R^{5-b} is C_{1-6}alkyl, C_{3-6}cycloalkyl, (C_{3-6}cycloalkyl)C_{1-6}alkyl, or (aryl)C_{1-6}alkyl, all being substituted with oxo or hydroxy on the C_{1-6}alkyl or C_{3-6}cycloalkyl moiety;

B^1 is —CH_2—CH_2— wherein one or two hydrogen atoms may be replaced by C_{1-6}alkyl or aryl, or two geminal hydrogen atoms may be replaced by a C_{4-6}alkanediyl radical optionally substituted with one or two C_{1-6}alkyl radicals;

D^{2-a} is =CH— or =CH—C(=O)— wherein the hydrogen atom may be replaced by C_{1-6}alkyl;

R^{14} is hydrogen or C_{1-6}alkyl;

R^{6-a} is C_{3-6}alkenyl, C_{3-6}alkynyl, aryl, C_{3-7}cycloalkyl, (C_{3-7}cycloalkyl)C_{1-6}alkyl, C_{1-6}alkyloxyC_{1-6}alkyl, mono-, di-, or trihaloC_{1-6}alkyl; C_7cycloalkyl or (C_7cycloalkyl)C_{1-6}alkyl, both being substituted with oxo or hydroxy on the C_{1-6}alkyl or C_7cycloalkyl moiety;

R^{6-b} is C_{1-6}alkyl, (aryl)C_{1-6}alkyl; or C_{1-6}alkyl, C_{3-6}cycloalkyl, (C_{3-6}cycloalkyl)C_{1-6}alkyl, or (aryl)C_{1-6}alkyl being substituted with oxo or hydroxy on the C_{1-6}alkyl or C_{3-6}cycloalkyl moiety;

R^{6-c} is mono-, di-, or trihaloC_{1-6}alkyl; or C_7cycloalkyl or (C_7cycloalkyl)C_{1-6}alkyl, both being optionally substituted with oxo or hydroxy on the C_{1-6}alkyl or C_7cycloalkyl moiety; or R^{6-c} and R^9 taken together may form a bivalent C_{3-5}alkanediyl radical optionally substituted with one or two C_{1-6}alkyl radicals;

E^{1-a} is —CH_2—CH_2— wherein one or two hydrogen atoms may be replaced by C_{1-6}alkyl;

R^{6-d} is C_{1-6}alkyl, C_{3-6}cycloalkyl, (C_{3-6}cycloalkyl)C_{1-6}alkyl, or (aryl)C_{1-4}alkyl being substituted with oxo or hydroxy on the C_{1-6}alkyl or C_{3-6}cycloalkyl moiety; and

E^{2-a} is —NR^{11}—C(=O)l,

wherein aryl is as defined above.

4,931,445

AGENTS FOR TREATMENT OF MALE IMPOTENCE

Irwin Goldstein, 85 Old Farm Rd., Milton, Mass. 02187; Inigo S. de Tejada, 82 Willet St., Wollaston, Mass. 02170, and Leslie A. Riblet, 145 Chestnut Hill Rd., Killingworth, Conn. 06417

Filed Oct. 6, 1988, Ser. No. 254,346

Int. Cl.[5] A61K *31/50*

U.S. Cl. 514—252 **8 Claims**

1. A method for treating male sexual impotence which comprises administering a non-toxic therapeutically effective dose of etoperidone or a pharmaceutically acceptable acid addition salt thereof to a patient in need of such treatment.

4,931,446

ANTIMICROBIAL FOR IN-VITRO DIAGNOSTIC KITS

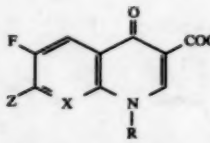
Bonnie Berger-Neel, Wildwood; Beth K. Gershon, Lake Zurich, and John P. Groff, Gurnee, all of Ill., assignors to Abbott Laboratories, Abbott Park, Ill.

Filed Mar. 23, 1988, Ser. No. 172,056

Int. Cl.[5] A01N *37/10, 43/60*

U.S. Cl. 514—254 **3 Claims**

1. An antimicrobial composition comprising a synergistic combination of: (a) an aryl-fluoroquinolone having the structure:



wherein R is p-fluorophenyl, X is CH and Z is piperazinyl and (b) a p-hydroxybenzoate ester blend comprising from about 65 to about 70% (w/w) methyl p-hydroxybenzoate, from about 15 to about 20% (w/w) of ethyl p-hydroxybenzoate and from about 10 to about 15% (w/w) of propyl p-hydroxybenzoate wherein the concentration of (a) is from about 0.03 micrograms/ml to about 10 micrograms/ml and the concentration of (b) is from about 0.01% (w/v) to about 0.2% (w/v)

4,931,447

CYCLOALKYLAMIDES OF (8β)-1-ALKYL-6-(SUBSTITUTED) ERGOLINES

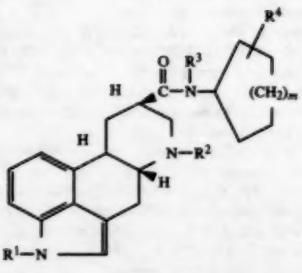
Mark M. Foreman; William L. Garbrecht; Gifford P. Marzoni, all of Indianapolis, and Kathleen R. Whitten, Zionsville, all of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Continuation of Ser. No. 62,285, Jun. 15, 1987, abandoned. This application Aug. 14, 1989, Ser. No. 394,320

Int. Cl.[5] A61K *31/48*; C07D *457/06*

U.S. Cl. 514—288 **44 Claims**

1. A method of blocking $5HT_2$ receptors which comprises administering to a mammal having an excess of serotonin centrally or peripherally a $5HT_2$ blocking dose of a



wherein:

R^1 is C_1–C_4 alkyl;

R^2 is allyl or C_1–C_4 straight chain alkyl;

R^3 is hydrogen of C_1–C_4 straight chain alkyl;

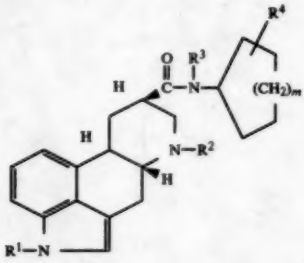
R^4 is hydrogen, C_1–C_4 alkyl, hydroxy or C_1–C_4 alkoxy;

m is 0, 1, 2 or 3;

provided when R^1 and R^2 are each methyl and R^3 and R^4 are each hydrogen, m may not be 0; and

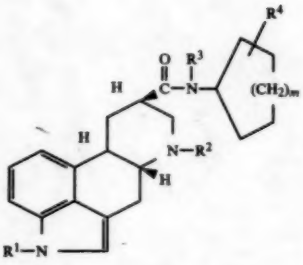
the pharmaceutically acceptable acid addition salts thereof.

7. A method of treating hypertension in mammals which comprises administering to a hypertensive mammal a hypotensive dose of a compound of the formula



13. A method of treating migraine in mammals which comprises administering to a mammal suffering from migraine a migraine relieving dose of a compound of claim 1.

19. A method of treating of treating vasospasm in mammals which comprises administering to a mammal experiencing vasospasm a vasospasm relieving dose of a compound of the formula



wherein:

R^1 is C_1–C_4 alkyl;

R^2 is allyl or C_1–C_4 straight chain alkyl;

R^3 is hydrogen or C_1–C_4 straight chain alkyl;

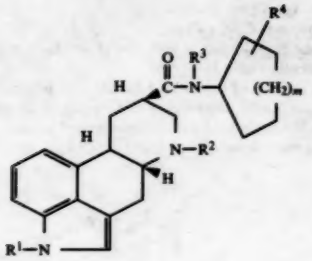
R^4 is hydrogen, C_1–C_4 alkyl, hydroxy or C_1–C_4 alkoxy;

m is 0, 1, 2 or 3;

provided when R^1 and R^2 are each methyl and R^3 and R^4 are each hydrogen, m may not be 0; and

the pharmaceutically acceptable acid addition salts thereof.

25. A method of treating thrombosis in mammals which comprises administering to a mammal subject to thrombotic episodes a thrombosis alleviating dose of a compound of the formula



wherein:

R^1 is C_1–C_4 alkyl;

R^2 is allyl or C_1–C_4 straight chain alkyl;

R^3 is hydrogen or C_1–C_4 straight chain alkyl;

R^4 is hydrogen, C_1–C_4 alkyl, hydroxy or C_1–C_4 alkoxy;

m is 0, 1, 2 or 3;

provided when R^1 and R^2 are each methyl and R^3 and R^4 are each hydrogen, m may not be 0; and

the pharmaceutically acceptable acid addition salts thereof.

4,931,448

THIOMIDATE INSECTICIDES

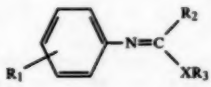
Michael D. Broadhurst, Novato, and Thomas H. Cromartie, Albany, both of Calif., assignors to ICI Americas Inc., Wilmington, Del.

Filed Nov. 17, 1987, Ser. No. 122,878

Int. Cl.[5] C07D *213/64*; C07C *119/20*; A01N *43/40, 47/42*

U.S. Cl. 514—351 **12 Claims**

1. A compound having the formula

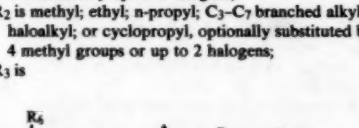


in which:

R_1 is 4-halo; 4-methyl; 3,4-disubstitution in which the substituents are independently halo, methyl, trifluoromethyl, trifluoromethylthio, trifluoromethoxy; or a 3,4-alkylenedioxy group having from 1 to 4 carbon atoms, optionally substituted by up to 2 halogens;

R_2 is methyl; ethyl; n-propyl; C_3–C_7 branched alkyl; C_1–C_6 haloalkyl; or cyclopropyl, optionally substituted by up to 4 methyl groups or up to 2 halogens;

R_3 is



(a)

in which:

m is 0 or 1;

A is N or —CH, B is CH;

R_4 is hydrogen or halo;

R_5 is hydrogen, mono- or di-halo, C_1–C_4 alkyl, C_1–C_4 alkoxy, trifluoromethyl, cyano, C_1–C_4 alkylthio, or C_1–C_4 alkylsulfonyl; and

R_6 is hydrogen or methyl;

(b) pentafluorobenzyl; or

(c) 2-methyl, 3-phenylbenzyl; provided that:

(i) if R_1 is 4-chloro, then R_2 is not dichloromethyl; and

(ii) R_2 is not 1,3-dihalopropyl; and X is sulfur.

4,931,449

2-((4-PIPERIDYL)METHYL)BENZOFURO(2,3-C)PYRIDINE DERIVATIVES, AND THEIR APPLICATION IN THERAPY

Mireille Sevrin, Paris; Pascal George, Vitry sur Seine, and Claude Morel, Cresly Magny les Hameaux, all of France, assignors to Synthelabo, Paris, France

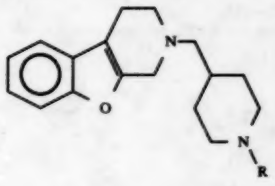
Filed Aug. 5, 1988, Ser. No. 228,747

Claims priority, application France, Aug. 7, 1987, 87 11287

Int. Cl.[5] C07D *491/048*; A61K *31/435*

U.S. Cl. 514—291 **4 Claims**

1. A compound of formula (I)



in which R is a benzyl, benzoyl, 3-chlorobenzoyl, 3-methylbenzoyl or (C_1–C_6 alkoxy)carbonyl group, or a pharmacologically acceptable acid addition salt thereof.

4. A method of treatment of hypertension which comprises administering to a subject suffering or liable to suffer therefrom an effective amount of a compound of formula (I) as defined in claim 1, or a pharmacologically acceptable salt thereof.

4,931,450

AMINO ACID DERIVATIVES

Ursula Sonnewald, Ballerup, Denmark, assignor to Novo Industri A/S, Bagsvaerd, Denmark

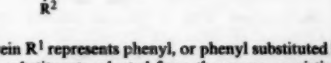
Continuation-in-part of Ser. No. 755, Jan. 6, 1987, abandoned. This application Oct. 17, 1988, Ser. No. 259,235

Claims priority, application Denmark, Jan. 7, 1986, 51/86; Mar. 3, 1986, 956/86

Int. Cl.[5] A61K *31/44*; C07D *401/06*

U.S. Cl. 514—326 **15 Claims**

1. Phenylbuten of the formula I



(I)

wherein R^1 represents phenyl, or phenyl substituted by one, or more substituents selected from the group consisting of halogen, C_{1-7}-alkyl, and C_{1-7}-alkoxy, R^2 represents furanyl, thienyl, pyridyl or pyrrolyl ortho substituted with C_{1-7}-alkyl or halogen and wherein R^3 represents 3-carboxypiperidin-1-yl, 3-carboxy-1,2,5,6-tetrahydropyridin-1-yl or 3-carboxymethyl-pyrrolidin-1-yl.

15. A method of treating a central nervous system ailment in a subject in need of such treatment comprising the step of administering to said subject an amount of a compound of the below stated formula I which is effective for the alleviation of such ailment in the form of a pharmaceutical composition thereof, in which (it) the compound of formula I is present together with a pharmaceutically acceptable carrier or diluent

(I)

wherein R^1 represents phenyl, or phenyl substituted by one, or more substituents selected from the group consisting of halogen, C_{1-7}-alkyl, and C_{1-7}-alkoxy, R^2 represents furanyl, thienyl, pyridyl or pyrrolyl ortho substituted with C_{1-7}-alkyl or halo-

gen and wherein R^3 represents 3-carboxypiperidin-1-yl, 3-carboxy-1,2,5,6-tetrahydropyridin-1-yl or 3-carboxymethyl-pyrrolidin-1-yl.

4,931,451

FUNGICIDAL PYRIDYL SULFENYL CARBAMATES

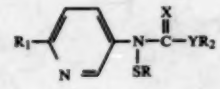
Don R. Baker, Orinda; Francis H. Walker, Mill Valley, and Keith H. Brownell, San Jose, all of Calif., assignors to ICI Americas Inc., Richmond, Calif.

Division of Ser. No. 114,811, Oct. 29, 1987, Pat. No. 4,800,205. This application Oct. 17, 1988, Ser. No. 258,409

Int. Cl.[5] C07D *401/02*; A61K *31/44*

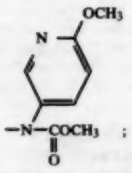
U.S. Cl. 514—335 **5 Claims**

1. A compound having the structural formula



wherein

R is



R_1 is selected from the group consisting of C_1–C_3 alkoxy, C_1–C_3 haloalkoxy and halogen;

R_2 is C_1–C_3 alkyl;

X is oxygen or sulfur; and

Y is oxygen or sulfur

or a fungicidally acceptable organic or inorganic salt thereof.

4,931,452

N-CYANOMETHYL-2-PYRIDINONE INSECTICIDES

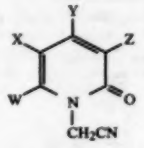
Sudarshan K. Malhotra, Walnut Creek; James E. Dripps; Gregory A. Bradfisch, both of Concord; Susan Wollowitz, Walnut Creek, all of Calif., and Ingrid L. Knox, Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 119,113, Nov. 10, 1987, abandoned. This application Aug. 24, 1988, Ser. No. 237,014

Int. Cl.[5] A01N *43/40*; C07D *211/78, 211/72, 211/84*

U.S. Cl. 514—344 **39 Claims**

1. An N-cyanomethyl-2-pyridinone compound of the Formula



wherein

W represents H, F, Cl, CH_3, or CF_3;

X represents H, F, Cl, Br, I, R, OR, OPh, SR, CF_2Cl, CN, COR, CO_2R', or CONR'R';

Y represents H, R, OR, SR, or OPh;

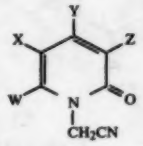
Z represents H, F, Cl, Br, I, R, OR, SR, OPh, NO_2, or CN;

R represents C_1–C_3 alkyl or C_1–C_3 alkyl partially or totally substituted with fluorine;

R' represents C_1–C_4 alkyl;

with the proviso that at least one of W, X, Y, and Z represents other than H.

23. A method of controlling insects which comprises contacting said insects, the locus of said insects, or the plants upon which said insects feed with an insecticidal amount of a compound of the Formula



wherein

W represents H, F, Cl, CH_3, or CF_3;

X represents H, F, Cl, Br, I, R, OR, OPh, SR, CF_2Cl, CN, COR, CO_2R', or CONR'R';

Y represents H, R, OR, SR, OR, or OPh;

Z represents H, F, Cl, Br, I, R, OR, SR, OPh, NO_2, or CN;

R represents C_1–C_3 alkyl or C_1–C_3 alkyl partially or totally substituted with fluorine;

R' represents C_1–C_4 alkyl;

with the proviso that at least one of W, X, Y, and Z represents other than H.

4,931,453

DI PHENYLPYRIDAZINE COMPOUNDS, PROCESSES FOR THE PREPARATION THEREOF AND PHARMACEUTICAL COMPOSITIONS COMPRISING THE SAME

Hisashi Takasugi; Atsushi Kuno, both of Osaka; Hiroyoshi Sakai, Kyoto; Yoshie Sugiyama, Hyogo, and Takao Takaya, Kawanishi, all of Japan, assignors to Fujisawa Pharmaceutical Company, Ltd., Osaka, Japan

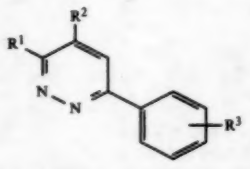
Division of Ser. No. 940,923, Dec. 12, 1986, Pat. No. 4,831,030. This application Dec. 19, 1988, Ser. No. 286,169

Claims priority, application United Kingdom, Dec. 12, 1985, 8530602

Int. Cl.[5] A61K *31/50*; C07D *403/06, 403/12*

U.S. Cl. 514—252 **6 Claims**

1. A diphenylpyridiazine compound of the formula:



wherein R^1 is piperazinyl(lower)alkyl, carbamoyl substituted with piperazinyl(lower)alkyl, or piperazinylcarbonyl, in each of which a piperazinyl group may be substituted with lower alkyl,

R^2 is phenyl substituted with nitro, and

R^3 is hydrogen or halogen, or a pharmaceutically acceptable salt thereof.

4,931,454

AZACHROMAN DERIVATIVES WITH EFFECTS ON THE CARDIOVASCULAR SYSTEM

Manfred Baumgarth, Darmstadt; Rolf Gericke, Seeheim; Ingeborg Lues, Darmstadt; Jacques De Peyer, Seeheim, and Rolf Bergmann, Reichelsheim, all of Fed. Rep. of Germany, assignors to Merck Patent Gesellschaft mit beschrankter Haftung, Darmstadt, Fed. Rep. of Germany

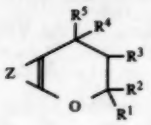
Filed Sep. 23, 1988, Ser. No. 248,502

Claims priority, application Fed. Rep. of Germany, Sep. 24, 1987, 3732146

Int. Cl.[5] **A61K** *31/495, 31/505;* **C07D** *491/052*

U.S. Cl. 514—254 **14 Claims**

1. An azachroman derivative of the formula



wherein

Z is

(a) —N=CH—CH=CH—,

(b) —CH=N—CH=CH—,

(c) —CH=CH—N=CH— or

(d) —CH=CH—CH=N—;

R^1 is A,

R^2 is H or A, or

R^1 and R^2 together are alkylene with 3–6 C atoms;

R^3 is OH or OAc,

R^4 is H, or

R^3 and R^4 together are a bond;

R^5 is 1H-2-pyridon-1-yl, 1H-6-pyridazinon-1-yl, 1H-2-pyrimidinon-1-yl, 1H-6-pyrimidinon-1-yl, 1H-2-pyrazinon-1-yl or 1H-2-thiopyridon-1-yl, or 1H-2-pyridon-1-yl, 1H-6-pyridazinon-1-yl, 1H-2-pyrimidinon-1-yl, 1H-6-pyrimidinon-1-yl, 1H-2-pyrazinon-1-yl or 1H-2-thiopyridon-1-yl mono- or disubstituted by A, F, Cl, Br, I, OH, OA, OAc, NO_2, NH_2, AcNH, HOOC or AOOC:

A is C_{1-6}-alkyl and

Ac is C_{1-8}-alkanoyl or C_{7-11}-aroyl; or a pharmaceutically acceptable salt thereof.

14. A composition comprising a compound according to claim **1** and a pharmaceutically acceptable carrier.

4,931,455

ALKYLAMINOPYRIMIDINE DERIVATIVE AND INSECTICIDE, ACARICIDE AND FUNGICIDE CONTAINING THE SAME AS ACTIVE INGREDIENT

Hirosuke Yoshioka, Wako; Tokio Obata, Ube; Katsutoshi Fujii, Ube; Haruo Yoshiya, Ube; Kiyoshi Tsutsumiuchi, Ube, and Shoji Shikita, Ube, all of Japan, assignors to Ube Industries, Ltd., Ube and Rikagaku Kenkyusho, Wako, both of, Japan

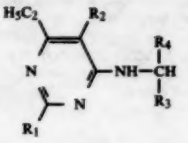
Filed Dec. 22, 1988, Ser. No. 289,626

Claims priority, application Japan, Jan. 7, 1988, 63-662; Jun. 27, 1988, 63-156684; Oct. 5, 1988, 63-249816

Int. Cl.[5] **A01N** *43/54;* **C07D** *239/42, 405/06*

U.S. Cl. 514—256 **52 Claims**

49. An insecticidal, acaricidal and fungicidal composition comprising a carrier and an effective amount of an active ingredient compound represented by the formula:



wherein R_1 represents a hydrogen atom, a halogen atom, a lower alkyl group, a cycloalkyl group having 3 to 6 carbon atoms, a halogenated lower alkyl group or a phenyl group; R_2 represents a halogen atom; R_3 represents a hydrogen atom, a lower alkyl group or a cycloalkyl group having 3 to 6 carbon atoms; R_4 represents a straight or branched alkyl group having 1 to 20 carbon atoms which may be substituted by at least one selected from the group consisting of 1 to 3 halogen atoms, an alkoxy group having 1 to 15 carbon atoms, a cycloalkylalkoxy group having 4 to 8 carbon atoms, dioxoranyl group, a lower alkoxyalkoxy group, a hydroxyl group, a methoxycarbonyl group, a cycloalkyl group having 3 to 6 carbon atoms, a 2-[2-(lower alkoxy)ethoxy]ethoxy group, a 4-t-butylbenzyloxy group, a pyranyloxy group, an imidazol-1-yl group, a triazol-1-yl group, a pyrazol-1-yl group and a substituent Q; where the substituent Q represents —A—B—R_Q, in which A represents an oxygen atom or an imino group; B represents a carbonyl group, a thiocarbonyl group or a sulfonyl group; and R_Q represents a lower alkyl group, a cycloalkyl group having 3 to 6 carbon atoms, a halogenated lower alkyl group, an alkoxy group having 1 to 5 carbon atoms, a phenyl group, a 4-methylphenyl group, a phenoxy group, a 3-chloroanilino group, a 2,6-dimethylmorpholin-4-yl group, a 4-methylpiperazin-1-yl group, an imidazol-1-yl group, a triazol-1-yl group, a pyrazol-1-yl group or an amino group substituted by 1 or 2 of lower alkyl groups,

or an acid addition salt thereof.

4,931,456

FUNGICIDAL OXIME NICOTINATES

Claude Lambert, Lyons; Regis Pepin, Rilleux La Pape, and Marie-Pascale Latorse, Lyons, all of France, assignors to Rhone-Poulenc Agrochimie, Lyons, France

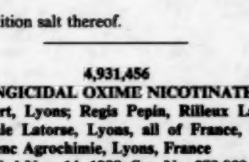
Filed Nov. 14, 1988, Ser. No. 270,020

Claims priority, application France, Nov. 12, 1987, 87 15897

Int. Cl.[5] **C07D** *213/57, 213/55, 401/12;* **A01N** *43/40*

U.S. Cl. 514—318 **4 Claims**

1. A derivative of formula:



in which

—R^I or R^{II} which are identical or different, are a hydrogen atom, a linear or branched alkyl radical having from 1 to 18 carbon atoms;

or form, with the carbon atom bonded to the nitrogen atom, a 5- or 6-membered ring, itself capable of carrying a phenyl radical, through the intermediacy of two adjacent carbon atoms; a phenyl radical unsubstituted or substituted by a substituent chosen from the group consisting of a halogen atom, an alkyl having from 1 to 4 carbon atoms, an alkoxy having from 1 to 4 carbon atoms, an amino unsubstituted or substituted by an alkyl having 1 to 4 carbon atoms, a nitro, another dioxyalkylene (C_1–C_3) carried by two adjacent phenyl carbon atoms, a pyridyl radical;

—Y is a hydrogen or halogen atom, or an alkyl or alkoxy radical having from 1 to 4 carbon atoms; and
—n is an integer from 1 to 3.

4. A method for combating the fungal diseases of plants, wherein an effective fungicidal amount of a compound according to claims 1 or 2 is applied to these plants or to the place where they are cultivated.

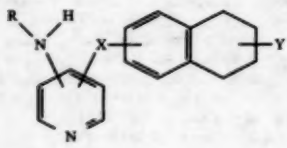
4,931,457

NAPHTHYLAMINO-AND NAPHTHYLOXY-PYRIDINAMINE COMOUNDS USEFUL AS TOPICAL ANTIINFLAMMATORY AGENTS FOR THE TREATMENT OF SKIN DISORDERS

Richard C. Effland; Joseph T. Klein, both of Bridgewater; Gordon E. Olsen, Somerset, and Larry Davis, Sergeantsville, all of N.J., assignors to Hoechst-Roussel Pharmaceuticals Inc., Somerville, N.J.

Filed Jun. 28, 1989, Ser. No. 372,508
Int. Cl.[5] A61K *31/435*
U.S. Cl. 514—349 **28 Claims**

1. A compound of the formula



where
R is hydrogen, loweralkyl, arylloweralky or loweralkylcarbonyl;
X is O or NR_1, R_1 being hydrogen, loweralkyl or loweralkylcarbonyl; and
Y is hydrogen, loweralkyl, loweralkoxy, halogen or trifluoromethyl;
the term aryl signifying a phenyl group optionally mono-substituted with a loweralkyl, loweralkoxy, halogen or trifluoromethyl group, or a pharmaceutically acceptable acid addition salt thereof.

27. A method of treating a patient in need of relief from dermatosis which comprises administering to such a patient an effective amount of a compound as defined in claim 1.

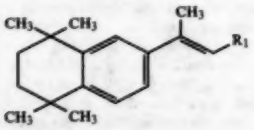
4,931,458

HETEROCYCLIC RODENTICIDAL COMPOUNDS, COMPOSITIONS CONTAINING THE COMPOUNDS, AND METHODS OF USE

Michael Klaus, Weil/Rhein, Fed. Rep. of Germany; Peter Loeliger, Muttenz, and Harald Weiser, Hochwald, both of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 940,994, Dec. 12, 1986, Pat. No. 4,816,476, which is a division of Ser. No. 725,181, Apr. 19, 1985, Pat. No. 4,659,735, which is a division of Ser. No. 507,857, Jun. 27, 1983, Pat. No. 4,535,086. This application Oct. 5, 1988, Ser. No. 253,802
Claims priority, application Switzerland, Jul. 6, 1982, 4117/82; May 19, 1983, 2728/83
Int. Cl.[5] A61K *31/455*; C07D *213/30*
U.S. Cl. 514—354 **21 Claims**

1. A compound of the formula



I

wherein R^1 is a group Ar—R_2; Ar is pyridyl, furyl or thienyl; R^2 is a group —CO_2R^3, —C(O)R^4, —CHOR^3, lower-alkylsulphonyl or formyl; R^3 is hydrogen or lower alkyl and R^4 is hydrogen, hydroxy, amino, lower-alkylamino, di-(lower-alkyl)amino or lower alkyl; or a salt of the compound.

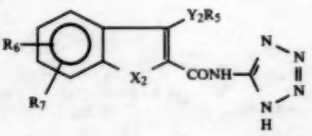
4,931,459

METHOD FOR TREATING ACUTE RESPIRATOR DISTRESS SYNDROME

David T. Connor, Ann Arbor; Michael D. Mullican, Ypsilanti; Roderick J. Sorenson, and David O. Thueson, both of Ann Arbor, all of Mich., assignors to Warner-Lambert Company, Morris Plains, N.J.

Division of Ser. No. 210,206, Jun. 27, 1988, Pat. No. 4,910,317, which is a continuation-in-part of Ser. No. 191,699, May 17, 1988, abandoned, which is a continuation-in-part of Ser. No. 73,554, Jul. 14, 1987, abandoned. This application Nov. 17, 1989, Ser. No. 438,928
Int. Cl.[5] A61K *31/41*
U.S. Cl. 514—381 **15 Claims**

1. A method for treating acute respiratory distress syndrome in humans in need thereof which comprises administering a compound of the formula (II)



II

wherein
(1) X_2 and Y_2 are independently oxygen or sulphur;
(2) R_6 and R_7 are independently hydrogen, halogen or OR_8 wherein R_8 is hydrogen, lower alkyl, aryl or aralkyl with the priviso that R_6 and R_7 cannot both be hydrogen at once; and
(3) R_5 is hydrogen, lower alkyl, aryl or aralkyl; in a unit dosage form.

4,931,460

POST-ISCHEMIC MYOCARDIAL DYSFUNCTION USING THROMBOXANE A_2 ANTAGONISTS

Gary J. Grover, Stockton, N.J., and Irvin E. Fulmor, III, Wrightstown, Pa., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Sep. 17, 1987, Ser. No. 98,424
Int. Cl.[5] A61K *31/34, 31/357*; G07D *307/00*
U.S. Cl. 514—381 **17 Claims**

1. A method of reducing or eliminating reperfusion injury due to post-ischemic myocardial dysfunction in a mammalian species, which comprises administering to a mammalian species in need of such treatment an effective amount of a thromboxane A_2 antagonist to reduce or eliminate reperfusion injury and decrease contractile dysfunction and decrease tissue necrosis.

4,931,461
PESTICIDAL SUBSTITUTED 5-METHYLAMINO-1-ARYLPYRAZOLES

Uta Jensen-Korte, Duesseldorf; Otto Schallner, Monheim; Jörg Stetter, Wuppertal; Benedikt Becker, Mettmann; Wolfgang Behrenz, Overath; Wilhelm Stendel, and Peter Andrews, both of Wuppertal, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

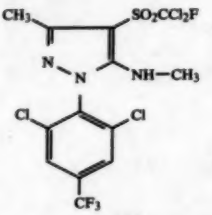
Filed Jun. 6, 1988, Ser. No. 203,358

Claims priority, application Fed. Rep. of Germany, Jun. 12, 1987, 3719732

Int. Cl.[5] **A01N** *43/56*; **C07D** *231/44*

U.S. Cl. 514—404 **3 Claims**

1. The compound 5-methylamino-3-methyl-4-dichlorofluoromethylsulphonyl-1-(2,6-dichloro-4trifluoromethylphenyl)-pyrazole of the formula



2. A pesticidal composition comprising a pesticidally effective amount of a compound according to claim 1 and a diluent.

4,931,462
HETEROCYCLIC SUBSTITUTED ALKYLSULPHONAMIDES PHARMACEUTICAL COMPOSITIONS CONTAINING THEM, AND ARTERIAL DISEASE TREATMENT THEREWITH

Walter-Gunar Friebe; Erhard Reinholz, both of Mannheim; Liesel Doerge, Lampertheim, and Karlheinz Stegmeier, Heppenheim, all of Fed. Rep. of Germany, assignors to Boehringer Mannheim GmbH, Mannheim, Fed. Rep. of Germany

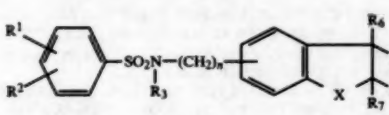
Filed Dec. 21, 1988, Ser. No. 287,888

Claims priority, application Fed. Rep. of Germany, Dec. 24, 1987, 3744141; Feb. 15, 1988, 3804636

Int. Cl.[5] **C07D** *209/34, 307/82*; **A61K** *31/395, 31/34*

U.S. Cl. 514—419 **21 Claims**

1. A sulphonamide of the formula



wherein

R_1 and R_2, which can be the same or different, are hydrogen, halogen, C_1–C_6-alkyl, C_1–C_6-alkoxy, C_1–C_6-alkylthio, C_1–C_6-alkylsulphinyl, C_1–C_6-alkylsulphonyl, trifluoromethyl, hydroxyl, or cyano,

R_3 and R_8, which can be the same or different, are hydrogen, C_1–C_6-alkyl, benzyl, or C_1–C_6-alkanoyl,

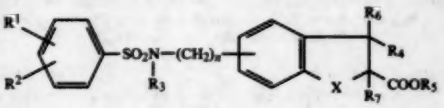
R_4 and R_5, which can be the same or different, are hydrogen or [C_1C_6-alkyl] C_1–C_6-alkyl,

R_6 and R_7 are both hydrogen or together form a valency bond,

X is oxygen or $=NR_8$ and

n is a whole number from 1 to 4, a physiologically acceptable salt thereof with an inorganic or organic base and, when the compound comprises an asymmetric carbon, a racemic mixture or optically active form thereof.

12. A method for the treatment of peripheral arterial occlusive diseases which comprises administering to a patient in need of such treatment amount of a compound of the formula



wherein

R_1 and R_2, which can be the same or different, are hydrogen, halogen, C_1–C_6-alkyl, C_1–C_6-alkoxy, C_1–C_6-alkylthio, C_1–C_6-alkylsulphinyl, C_1–C_6-alkylsulphonyl, trifluoromethyl, hydroxyl, or cyano,

R_3 and R_8, which can be the same or different, are hydrogen, C_1–C_6-alkyl, benzyl, or C_1–C_6-alkanoyl,

R_4 and R_5, which can be the same or different, are hydrogen or C_1–C_6-alkyl,

R_6 and R_7 are both hydrogen or together form a valency bond,

X is oxygen or $=NR_8$, and

n is a whole number from 1 to 4, a physiologically acceptable salt thereof with an inorganic or organic base and, when the compound comprises an asymmetric carbon, a racemic mixture or optically active form thereof.

4,931,463
OXETANONES

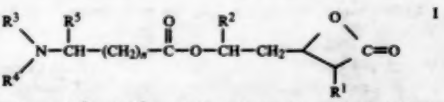
Pierre Barbier, Rixheim, France; Fernand Schneider, Basel, and Ulrich Widmer, Rheinfelden, both of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Continuation of Ser. No. 809,353, Dec. 16, 1985, abandoned. This application Dec. 17, 1987, Ser. No. 134,322

Int. Cl.[5] **A61K** *31/365*; **C07D** *405/12*

U.S. Cl. 514—422 **19 Claims**

1. A racemic compound of the formula



I

[wherein R^1 and R^2 are independently C_{1-17}-alkyl which is saturated or optionally interrupted by up to 8 double or triple bonds and/or optionally interrupted by an O or S atom which is present in a position other than the α-position to a unsaturated C-atom; or phenyl, benzyl or —C_6H_4—X—C_6H_5 ring-substituted by 0 to 3 C_{1-6}-alkyl-(O or S)$_{1 \text{ or } 0}$ groups, X is oxygen, sulfur or $(CH_2)_{0-3}$, R^3 is hydrogen, C_{1-3}-alkyl or C_{1-3}-alkanoyl, R^4 is hydrogen or C_{1-3}-alkyl, and R^5 is hydrogen, a group Ar or Ar-C_{1-3}-alkyl or C_{1-7}-alkyl optionally interrupted by Y and optionally substituted by Z, or R^4 forms with R^5 a 4- to 6-membered saturated ring, Y is oxygen, sulfur or a group $N(R^6)$, $C(O)N(R^6)$ or $N(R^6)C(O)$, Z is a group —(O or S)—R^7, —$N(R^7, R^8)$, —$C(O)N(R^7, R^8)$ or —$N(R^7)C(O)R^8$, n is the number 1 or 0, with the proviso that R^5 is hydrogen when n is the number 1, Ar is phenyl which is unsubstituted or substituted by up to 3 groups R^9 or OR^9, and R^6, R^7, R^8 and R^9 individually are hydrogen or C_{1-3}-alkyl, with the proviso that R^4 is other than hydrogen when R^3 is formyl and R^5 is isobutyl or R^3 is acetyl and R^5 is carbamoylmethyl, and simultaneously R^2 is undecyl or 2,5-undecadienyl and R^1 is n-hexyl,] wherein R^1 is methyl, propyl, decyl, hexadecyl, allyl, benzyl or ethyl; R^2 is methyl, undecyl, 3-butenyl, 3-undecenyl, 8,11-heptadecadienyl, phenoxyphenyl or heptadecyl; R^3 is acetyl or formyl; R^4 is methyl or hydrogen and R^5 is hydrogen, methyl, 2-butyl, benzyl, methylthioethyl or i-butyl, or R^4 and R^5 together form a pyrrolidinyl moiety, and n is the number 1 or 0, an enantiomer or a diastereomer thereof, or a pharmaceutically acceptable acid addition salt thereof.

4,931,464

METHOD OF REDUCING PRE- AND POST-ISCHEMIC MYOCARDIAL ARRHYTHMIAS AND FIBRILLATION

Gary J. Grover, Stockton, N.J., and James L. Bergey, Lansdale, Pa., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Feb. 15, 1989, Ser. No. 311,321

Int. Cl.[5] A61K *31/40*

U.S. Cl. 514—423 9 Claims

1. A method of reducing pre- and post-ischemic arrhythmias and fibrillation as well as reducing arrhythmias associated with congestive heart failure in a mammalian species which comprises administering to a mammalian species in need of such treatment an effective amount of zofenopril or a pharmaceutically acceptable salt of zofenopril alone or in combination with a thrombolytic agent, antiarrhythmic agent, or antifibrillatory agent or with a non-pharmaceutical reperfusion technique.

4,931,465

BENZALDOXIME CARBAMATE DERIVATIVES

Christa Fest, Wuppertal; Wilhelm Brandes, Leichlingen; Stefan Dutzmann, Düsseldorf; Gerd Hänssler, Leverkusen, and Karl-Heinz Kuck, Langenfeld, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

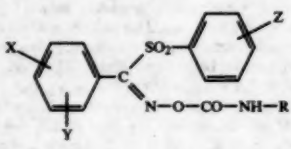
Filed Mar. 8, 1988, Ser. No. 165,651

Claims priority, application Fed. Rep. of Germany, Mar. 11, 1987, 3707687

Int. Cl.[5] A01N *47/12*; C07C *147/06*

U.S. Cl. 514—477 13 Claims

1. A benzaldoxime carbamate derivative of the formula



(I)

in which

X represents hydrogen, and

Y represents chlorine, or

X and Y represent fluorine,

Z represents hydrogen, halogen, alkyl, alkoxy or halogenoalkyl, and

R represents alkyl, halogenoalkyl, cyanoalkyl, and also phenyl or phenylalkyl, both of which are optionally monosubstituted to polysubstituted by identical or different substitutents selected from the group consisting of halogen, straight-chain or branched alkyl having 1 to 6 carbon atoms, straight-chain or branched alkoxy having 1 to 4 carbon atoms, or straight-chain or branched halogenoalkyl or halogenoalkoxy in each case having 1 to 4 carbon atoms and in each case 1 to 9 identical or different halogen atoms, or represents tosyl, or cycloalkyl which is optionally monosubstituted to polysubstituted by identical or different alkyl substituents.

4,931,466

CRYSTALLINE FORM AND ITS PREPARATION

Siegfried Kersten, Frankenthal; Karl-Friedrich Jaeger, Limburgerhof; Karl-Heinz Koenig, Frankenthal; Albrecht Mueller, Ludwigshafen; Josef B. Pawliczek, Speyer; Hans-Gert Recker, Ludwigshafen; Wolfgang Rohr, Wachenheim, and August Wigger, Neuhofen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

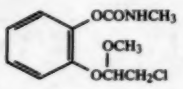
Continuation of Ser. No. 72,011, Jul. 10, 1987, abandoned. This application Feb. 15, 1989, Ser. No. 311,419

Claims priority, application Fed. Rep. of Germany, Jul. 19, 1986, 3624437

Int. Cl.[5] A01N *9/20*; C07C *125/06*

U.S. Cl. 514—490 8 Claims

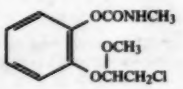
1. A compound of the chemical formula I



(I)

which consists essentially of the compound in its crystalline form which melts at 79° C.

8. The compound of the formula I



(I)

which consists essentially of the compound in its crystalline form which melts at 79° C. produced (a) by a process in which compound I is dissolved in methylene chloride, the solution is brought to below 40° C. and mixed with excess n-heptane at about 65°–70° C. so that a mixing temperature of about 55°–60° C. results, and, after cooling, isolating said compound I having the crystalline form which melts at 79° C., or (b) by a process in which compound I is dissolved in acetone and the solution is introduced into water at 5°–10° C., or (c) the crystalline form of the compound I which melts at 77° C. is heated at 55°–60° C. to form the crystalline form of compound I which melts at 79° C.

4,931,467

DRUG COMPOSITION FOR TREATING OR PREVENTING ACNE BY ORAL ADMINISTRATION

Didier Saint-Leger, and Ariette Bague, both of Paris, France, assignors to L'Oreal, Paris, France

PCT No. PCT/FR85/00011, § 371 Date Jul. 11, 1985, § 102(e) Date Jul. 11, 1985, PCT Pub. No. WO85/03226, PCT Pub. Date Aug. 1, 1985

PCT Filed Jan. 24, 1985, Ser. No. 758,646

Claims priority, application France, Jan. 25, 1984, 84 01131

Int. Cl.[5] A61K *31/07*, *31/215*

U.S. Cl. 514—529 6 Claims

1. A composition for treating or preventing acne by oral administrtion comprising an orally administrable pharmaceutically acceptable carrier and a carotenoid selected from the group consisting of α-carotene, δ-carotene, γ-carotene, β-carotene-4,4'-dione, ethyl 8'-apo-β-caroten-8'-oate, β-apo-8'-carotenal, ψ,ψ-carotene, ψ,ψ-carotene-16,16'-diol and ψ,ψ-caroten-16-ol, said carotenoid being present in an amount ranging from 0.001 to 10 percent by weight based on the total weight of said composition and at least one further substance, other than said carotenoid, effective in the treatment of acne, said further substance being present in an amount ranging from 0.001 to 15 percent by weight based on the total weight of said composition.

4,931,468

PHARMACEUTICAL AND DIETARY COMPOSITION

David F. Horrobin, Montreal, Canada, assignor to Efamol Limited, Surrey, United Kingdom

Continuation of Ser. No. 285,470, Jul. 21, 1981, abandoned, which is a continuation-in-part of Ser. No. 29,058, Apr. 11, 1979, Pat. No. 4,309,415. This application Aug. 21, 1984, Ser. No. 642,699

Claims priority, application United Kingdom, Apr. 11, 1978, 14172/78; Sep. 4, 1978, 35437/78

Int. Cl.[5] A61K *31/20*

U.S. Cl. 514—560 3 Claims

1. A method of treating malignant tumors sensitive to γ-linolenic acid or dihomo-γ-linolenic acid comprising administering to a person suffering therefrom an effective amount of γ-linolenic acid or physiologically functional derivative and/or dihomo-γ-linolenic acid or physiologically functional derivative thereof.

4,931,469

NOVEL PESTICIDES, PREPARATION AND USE

Malcolm H. Black, and Robert J. Blade, both of Tring, England, assignors to Burroughs Wellcome Co., Research Triangle Park, N.C.

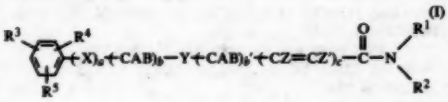
Continuation of Ser. No. 881,125, Jul. 2, 1986, abandoned, which is a division of Ser. No. 540,801, Oct. 11, 1983, Pat. No. 4,855,086. This application Jun. 8, 1988, Ser. No. 205,572

Claims priority, application United Kingdom, Oct. 15, 1982, 8229550; Dec. 21, 1982, 8236346; Jun. 7, 1983, 8313566

Int. Cl.[5] A01N *37/10, 37/12, 37/18*

U.S. Cl. 514—617 3 Claims

1. A method of controlling pests of the Order Acarina comprising applying to the pest an acaricidally effective amount of compound of formula (I)



(I)

wherein:

R^1 and R^2 are the same or different and each is hydrogen, alkyl, C_{3-8}cycloalkyl, C_{3-8}cycloalkyl-alkyl, phenyl, aralkyl or alkenyl, and wherein any of the groups mentioned of R^1 and R^2 may be substituted with alkoxy, alkyl, methoxycarbonyl, halo or hydroxy, in the above definition of R^1 and R^2, alkyl, and alkenyl contain 1 to 10 carbons; R^3, R^4 and R^5 are each independently hydrogen, halo, alkyl, alkenyl, alkoxy having at least two carbon atoms, phenyl and wherein the groups mentioned for R^3, R^4 and R^5 may substituted with alkoxy, alkyl, halo or hydroxy, in the above definition of R^3, R^4 and R^5; alkyl, alkenyl and alkoxy contain 1 to 6 carbons;

a is 1 or 2;

each X is C═C or CZ═CZ';

each Z and Z^2; is hydrogen, halo or alkyl;

Y is CAB, CH_2OCH_2 or $CH_2S(O)_dCH_2$ where d is 0, 1 or 2;

each A and B is hydrogen, alkyl or halo provided that neither A nor B is halo in a group CAB which is α to an unsaturated carbon atom;

b and b', which may be the same or different, are O or an integer from 1 to 5, b and b' together totalling not more than 7;

c is 1 or 2; and the configuration of any olefinic group conjugated to the CO group in Formula (I) is E.

4,931,470

ANTIARRHYTHMIC METHOD

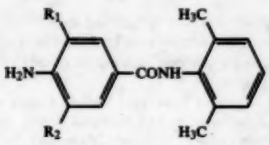
Donald R. Holland, Indianapolis, and David W. Robertson, Greenwood, both of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Filed Dec. 27, 1988, Ser. No. 290,675

Int. Cl.[5] A61K *31/165*

U.S. Cl. 514—619 4 Claims

1. A method of treating cardiac arrhythmias comprising administering to a mammal suffering from an arrhythmia and in need of treatment an antiarrhythmic amount of a benzamide of the formula



1

wherein R_1 and R_2 are each independently hydrogen or methyl, or a pharmaceutically acceptable salt thereof.

4,931,471

AMIDES OF PARAMETHOXYCINNAMIC AND UTILIZATION THEREOF AS SOLAR FILTERS

Louis Jung, Strasbourg, and Dominique Robert, Draguignan, both of France, assignors to Universite Louis Pasteur, Strasbourg, France

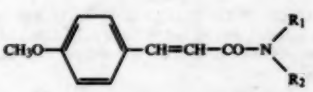
Continuation of Ser. No. 939,119, Nov. 19, 1986, abandoned. This application Oct. 3, 1988, Ser. No. 252,655

Claims priority, application France, Mar. 28, 1985, 85 04898

Int. Cl.[5] A61K *31/165*; C07C *103/84*

U.S. Cl. 514—622 9 Claims

6. A therapeutic method for protecting human skin from solar radiation, comprising the step of topically applying to skin of a human who is in need of said therapy a therapeutic amount of an amide of the formula



in which:

the ethylenic double bond can exist either in the trans form or in the cis form;

R_1 individually represents hydrogen; and

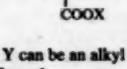
R_2 individually represents:

an aryl group,

a group of the formula:

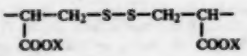
where X and Y can be an alkyl group or an aryl group,

a group of the formula:



where Z can be hydrogen, an alkyl group or an aryl group and where n is an integer between 1 and 6, or

a group of the formula:



to which two molecules of filter chromophores of the paramethoxycinnamic acid are attached; or

can be a peptide structure comprising two or more amino acids in which the terminal or branched acid or amine-functional groups can be free or part of ester or amide groups;

wherein said alkyl groups have 1–12 carbon atoms, and said aryl groups are substituted or unsubstituted benzyl or phenyl groups or homologs thereof, or furanyl, pyridinyl, or oxazolyl groups.

4,931,472

FLUORINATED TRIETHYLENEDIAMINE AS AN OXYGEN TRANSPORT AGENT

William E. Erner, Burke, Va., assignor to Biomed Technology, Inc., Burke, Va.

Filed Sep. 17, 1985, Ser. No. 776,805
Int. Cl.[5] A61K *31/13*
U.S. Cl. 514—661 **17 Claims**

1. An artificial blood comprising a physiologically acceptable, stable, essentially homogeneous formulation of an effective oxygen-transporting amount of highly fluorinated triethylenediamine dispersed in water, said highly fluorinated triethylenediamine comprising perfluorotriethylenediamine, undecafluorotriethylenediamine or decafluorotriethylenediamine, or any combination thereof.

4,931,473

ANESTHETIC ORAL COMPOSITIONS

William J. Kelleher, Storrs, and William J. McClintock, Southbury, both of Conn., assignors to Richardson-Vicks Inc., Shelton, Conn.

Filed Feb. 15, 1989, Ser. No. 311,155
Int. Cl.[5] A61K *31/12*
U.S. Cl. 514—688 **8 Claims**

1. A method of stabilizing oral anesthetic pharmaceutical compositions containing a β-aminopropiophenone which comprises adding to said compositions a stabilizing amount of saccharin.

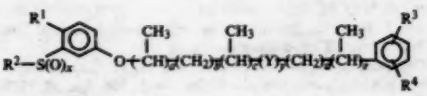
4,931,474

ETHER DERIVATIVE AND AN ACARICIDAL OR INSECTICIDAL COMPOSITION COMPRISING SAID DERIVATIVE

Shoichi Kato, Ageo, and Tatsumi Hayaoka, Tokyo, both of Japan, assignors to Nippon Kayaku Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 27, 1987, Ser. No. 78,151
Claims priority, application Japan, Aug. 6, 1986, 61-184677
Int. Cl.[5] A01N *59/02*; C07C *147/14*
U.S. Cl. 514—708 **3 Claims**

2. A method for killing acarid(s) or insect(s), which comprises applying an effective amount of the compound of the formula:



wherein

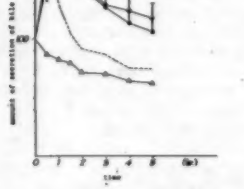
R^1 is chloro or methyl,
R^2 is ethyl, n-propyl, n-butyl, isobutyl, n-amyl or n-hexyl,
R^3 is hydrogen, chloro, fluoro, $—CF_3$, nitro, methyl, ethyl, t-butyl, methoxy, methylthio, ethylthio or n-propylthio,
R^4 is hydrogen, chloro or methyl,
Y is oxygen, sulfur, sulfinyl or sulfonyl,
x is 0 or 1,
y is 1,
a is 0 or 1,
b is an integer of 1 to 6,
c is 0 or 1,
d is 0, 1 or 2,
e is 0 or 1,
and the sum of a, b, c, d and e is seven or below.

4,931,475

CHOLAGOGUE AND/OR GALLSTONE SOLUBILIZER

Akira Uji, Hirakata, Japan, assignor to Hiya Pharmaceutical Co., Ltd., Osaka, Japan

PCT No. PCT/JP84/00208, § 371 Date Dec. 10, 1985, § 102(e) Date Dec. 10, 1985, PCT Pub. No. WO85/04804, PCT Pub. Date Nov. 7, 1985
PCT Filed Apr. 21, 1984, Ser. No. 815,710
Int. Cl.[5] A61K *33/05, 31/23, 31/225, 31/335*
U.S. Cl. 514—729 **6 Claims**



1. A method of increasing the flow of bile comprising administering to patients requiring such treatment a cholagogic effective amount of a borneol compound and a pharmaceutically acceptable diluent.

2. A method of dissolving gallstones comprising administering to patients requiring such treatment a gallstone dissolving effective amount of a borneol compound and a pharmaceutically acceptable diluent.

4,931,476

CROSSLINKED POLYMERS AND A PROCESS FOR THEIR PREPARATION

Otto Mauz, Liederbach; Siegfried Noetzel, Kelkheim, and Klaus Sauber, Schwalbach am Taunus, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Aug. 26, 1987, Ser. No. 89,443

Claims priority, application Fed. Rep. of Germany, Aug. 28, 1986, 3629177

Int. Cl.[5] C08G 59/00

U.S. Cl. 521—34 4 Claims

1. A crosslinked polymer which is substantially composed of (A) 1 to 70% by weight of units derived from at least one component selected from the group consisting of glycidyl acrylate, glycidyl methacrylate, allyl glycidyl ether and vinyl glycidyl ether, and (B) 99 to 30% by weight of units derived from at least one of N,N'-divinylethylene urea and N,N'-divinylpropyleneurea, with the total the units being 100% by weight, said polymer composed of particles having an essentially spherical shape, a mean particle size of 10 to 600 μm and a mean pore diameter of 5 to 1,000 nm.

4,931,477

POLYPROPYLENE RESIN PRE-EXPANDED BEADS, MANUFACTURING METHOD THEREOF AND EXPANSION-MOLDING METHOD USING SAID BEADS

Hitoshi Shiiki, Ibaraki; Minoru Tada, and Kyoichi Nakamura, both of Kamisu, all of Japan, assignors to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Dec. 9, 1988, Ser. No. 282,137

Claims priority, application Japan, Dec. 11, 1987, 62-315008

Int. Cl.[5] C08J 9/22

U.S. Cl. 521—58 3 Claims

1. Polypropylene resin pre-expanded beads characterized in that polypropylene resin pre-expanded beads originally having a bulk density of not higher than 0.0930 g/cc are shrunk to give a bulk volume ratio of 10–75% at the normal temperature and the normal pressure.

4,931,478

PROCESS FOR THE PREPARATION OF AN EXPANDABLE VINYL PLASTISOL

Jean-Luc Preat, Grimbergen, Belgium, assignor to Solvay & Cie (Societe Anonyme), Brussels, Belgium

Filed Sep. 29, 1988, Ser. No. 250,550

Claims priority, application France, Oct. 12, 1987, 87 14168

Int. Cl.[5] C08J 9/10

U.S. Cl. 521—73 7 Claims

1. Process for the preparation of an expandable vinyl plastisol capable of yielding cellular products comprising a nitrogen-based blocking agent decomposing when heated and a zinc compound as accelerator lowering the decomposition temperature of the blowing agent, wherein said zinc compound is a zinc salt incorporated into the plastisol in the form of an aqueous solution.

4,931,479

FOAM IN PLACE CONDUCTIVE POLYURETHANE FOAM

Noredin H. Morgan, Billerica, Mass., assignor to Chomerics, Inc., Woburn, Mass.

Filed Nov. 7, 1988, Ser. No. 267,599

Int. Cl.[5] C08G 18/14

U.S. Cl. 521—76 24 Claims

1. A conductive polyurethane foam consisting essentially of an isocyanate containing component reacted with an active hydrogen containing component and one or more conductive fillers, wherein the one or more conductive fillers are present in an amount from about 40 parts by weight to about 150 parts by weight so as to provide EMI/RFI shielding.

4,931,480

PROCESS FOR THE PREPARATION OF POLYURETHANE FOAMS

Kurt Krippl, Monheim; Klaus Schulte; Erwin Hoffmann, both of Leverkusen, and Rolf Wiedermann, Odenthal, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Feb. 27, 1989, Ser. No. 316,378

Claims priority, application Fed. Rep. of Germany, Mar. 11, 1988, 3808081

Int. Cl.[5] C08G 18/14

U.S. Cl. 521—99 4 Claims

1. In a process for the preparation of polyurethane foams by reaction of a foamable reaction mixture of (a) one or more organic polyisocyanates, (b) one or more polyols with molecular weights of from 350 to 10,000, (c) one or more liquid blowing agents and, optionally, (d) other additives, by first adding the liquid blowing agent to component (a) and/or (b) and in addition dispersing an inert gas in the component, immediately and continuously transferring this component to the process of mixing with the other component and at the same time keeping the gas-containing component at least under the pressure at which gas charging takes place until the component is mixed, and leaving the reaction mixture obtained to foam up, the improvement wherein the component (a) and/or (b) which contains a blowing agent, is charged with no more than 10 volume % of gas, the gas being so finely dispersed in the components that the maximum average size of gas bubbles obtained is 1.5 mm, said volume percent being based on a gas at 22° C. and normal atmospheric pressure.

4,931,481

PROCESS FOR THE PRODUCTION OF FOAMS BASED ON AROMATIC ISOCYANATES USING $MG(OH)_2$ AND THE FOAMS PRODUCED THEREBY

Norbert Adam, Cologne, and Rolf Wiedermann, Odenthal, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Bayerwerk, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 96,876, Sep. 15, 1987, abandoned. This application Dec. 19, 1988, Ser. No. 286,542

Claims priority, application Fed. Rep. of Germany, Sep. 27, 1986, 36 32 915; Canada, Sep. 10, 1987, 546616; European Pat. Off., Sep. 16, 1987, 87 113 516.6; Japan, Sep. 25, 1987, 239139-87

Int. Cl.[5] C08G 18/14

U.S. Cl. 521—123 21 Claims

1. A method for reducing smoke in a foam exposed to fire, wherein said foam is prepared by reacting a mixture of

(a) an organic aromatic polyisocyanate and

(b) an isocyanate-reactive compound in the presence of

(c) a blowing agent, comprising adding to the reaction mixture a smoke-reducing agent consisting of $Mg(OH)_2$ alone or in the presence of a combustion modifying agent containing phosphorus or nonionic halogen.

4,931,482

USE OF 1,1,1,4,4,4-HEXAEFLUOROBUTANE AS A BLOWING AND INSULATING GAS FOR THE PRODUCTION OF FOAM PLASTICS

Wilhelm Lamberts, Cologne; Klaus-Dieter Sommerfeld, Overath; Dietmar Bielefeldt, Ratingen; Albrecht Marhold, Leverkusen, and Michael Negele, Cologne, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed May 22, 1989, Ser. No. 355,530

Claims priority, application Fed. Rep. of Germany, Jun. 1, 1988, 3818692

Int. Cl.[5] C08J 9/14

U.S. Cl. 521—131 8 Claims

1. In a method of producing an isocyanate-based polymer closed cell foam wherein a blowing agent is used, the improve-

ment comprising using 1,1,1,4,4,4-hexafluorobutane as the blowing agent.

4,931,483

POLYMER/POLYOL COMPOSITION, PROCESSES FOR MAKING THE SAME AND A POLYURETHANE THEREFROM

Masahiro Matsuoka, Kyoto; Keiichi Akimoto, Osaka; Takeshi Sumita, Ohtsu; Tsuyoshi Tomosada, Kyoto, and Isao Ishikawa, Ohtsu, all of Japan, assignors to Sanyo Chemical Industries, Ltd., Kyoto, Japan

Filed Dec. 5, 1988, Ser. No. 279,508

Claims priority, application Japan, Dec. 4, 1987, 62-308417; Dec. 14, 1987, 62-315641; Jul. 8, 1988, 63-171384

Int. Cl.[5] C08G *18/14*

U.S. Cl. 521—137 20 Claims

1. A polymer/polyol composition, which is convertible by reaction with a polyisocyanate to a polyurethane, wherein the polymer of said composition is formed by polymerizing, *in situ* in at least one polyol, at least one ethylenically unsaturated monomer comprising an alpha-olefin containing at least 5 carbon atoms, an acrylate or methacrylate ester of an alcohol containing at least 9 carbon atoms, or a mixture of two or more of the same; said polyol comprising a polyol having a hydroxyl number of 15–200, and being selected from the group consisting of polyether polyols, polyester polyols, urethane-modified polyols, polyols modified so as to contain polymerizable unsaturated bonds in the molecules and polymer/polyols previously presented *in situ* in any of these polyols; said polymer being present in an amount of 1–80% based on the weight of said composition.

4,931,484

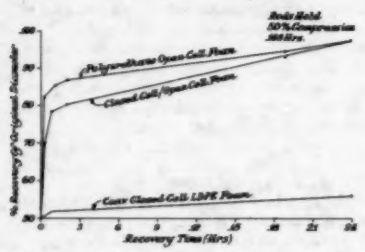
EXTRUDED ETHYLENIC POLYMER FOAM CONTAINING BOTH OPEN AND CLOSED CELLS

Edward E. Hovis, Newark; Eric D. Johnson, Wilmington, and Michael J. Schroeder, Newark, all of Del., assignors to Applied Extrusion Technologies, Inc., Middletown, Del.

Continuation-in-part of Ser. No. 257,510, Oct. 13, 1988, abandoned. This application Jun. 14, 1989, Ser. No. 365,838

Int. Cl.[5] C08J *9/00*

U.S. Cl. 521—143 18 Claims



1. An extruder polymer foam comprising an ethylenic polymer having a cross-section of from about 0.20 in^2 to about 40 in^2, a density of from about 1.5 $lb./ft^3$ to about 10 $lb./ft^3$ and a compression resistance of 10 psi or less at 50% compression, where the foam contains from about 30% to about 85% open cells and the remainder closed cells, an integral skin covering the foam, and the foam being non-out gassing as determined by ASTM C24.32.13 (Task Group 13) Proposed Test Method for Determining Outgassing.

4,931,485

ORGANOPOLYSILOXANE COMPOSITION

Yoshio Inoue, Annaka, and Atsushi Yaginuma, Maebashi, both of Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

Filed Sep. 9, 1988, Ser. No. 242,615

Claims priority, application Japan, Sep. 10, 1987, 62-226931

Int. Cl.[5] C08J *9/00*

U.S. Cl. 521—154 9 Claims

1. A foamable organopolysiloxane composition which comprises an organopolysiloxane base polymer containing a vinyl group-containing organopolysiloxane, an organohydroxypolysiloxane and an organohydrogenpolysiloxane; and a siloxane copolymer selected from copolymer (I) composed of: (A)

$$R^1_n(R^2\text{—}\underset{\underset{CHR^3}{\|}}{C}\text{—}O)_{3-n}Si(CH_2)_mR^4{}_2SiO_{0.5}$$

unit,

(B) $R^5{}_3SiO_{0.5}$ unit and

(C) SiO_2 unit

where R^1, R^2, R^4, and R^5 each denotes a monovalent hydrocarbon group excluding aliphatic unsaturated hydrocarbon groups; R^3 denotes a hydrogen atom or monovalent hydrocarbon group excluding aliphatic unsaturated hydrocarbon group; n denotes an integer of 0, 1 or 2; and m denotes an integer of 2 to 6

or copolymer (II) composed of unit (A), unit (B), unit (C) and

(D) $R^6{}_2SiO$ unit,

where R^6 denotes a monovalent hydrocarbon group excluding aliphatic unsaturated hydrocarbon groups,

where R^6 denotes a monovalent hydrocarbon group excluding aliphatic unsaturated hydrocarbon groups,

wherein unit (A), unit (B) and unit (C) are defined as above.

4,931,486

POLY(ALKYLENE CARBONATE) POLYOLS AS ANTISTATIC ADDITIVES FOR POLYURETHANES

Michael O. Myers, Baton Rouge, La., assignor to The Dow Chemical Company, Midland, Mich.

Filed Dec. 2, 1988, Ser. No. 279,469

Int. Cl.[5] C08G *18/14*

U.S. Cl. 521—159 10 Claims

1. A polyurethane polymer which is the product of a reaction mixture comprising an organic polyisocyanate, a poly(alkylene carbonate) polyol and a polyester polyol, wherein the poly(alkylene carbonate) polyol is a polymer of an oxirane and carbon dioxide or a cyclic alkylene carbonate, having a carbon dioxide content of about 2 to about 35 percent by weight and wherein the ratio of poly(alkylene carbonate) polyol to polyester polyol in the reaction mixture is from about 1:100 to about 1:1, and said reaction being conducted in the substantial absence of a semi-conductive filler and an ionizable salt.

4,931,487

CHAIN EXTENDERS FOR POLYURETHANES

Ralph D. Priester, Jr., Lake Jackson, Tex.; Edwin J. Strojny, Harbor Springs, and Debra H. Stutts, Midland, both of Mich., assignors to Dow Chemical Company

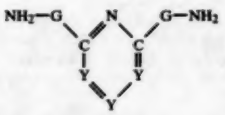
Filed Mar. 4, 1988, Ser. No. 164,043

Int. Cl.[5] C08G *18/00, 18/14*

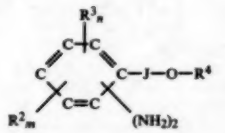
U.S. Cl. 521—163 38 Claims

1. A process for producing polyurethane or polyurethane-polyurea polymers by subjecting to a reaction injection molding process, a reaction mixture comprising (1) at least one polyisocyanate components: (2) at least one relatively high equivalent weight active hydrogen component; and (3) a di-

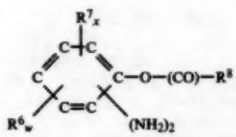
amine chain extender selected from the group consisting of: (a) heterocyclic diamines having a structure represented by Formula I:



wherein each G is a divalent bridging group or a covalent bond; each Y is independently nitrogen or a =CR— group, but at least one Y is a =CR— group, wherein each R is independently hydrogen, an alkyl group or an aryl group which groups are unsubstituted or substituted with groups which do not interfere undesirably with polyurethane formation; (b) di(aromatic amine) disulfides; (c) alkyl ethers of halogen-substituted aromatic diamines having a structure represented by Formula III



wherein m is an integer in the range of 0 to about 2 and n is an integer in the range of 1 to about 2, such that the sum of n and m is 3; J is nothing or $—CH_2—$; each R^2 is independently hydrogen, an alkyl group having from one to about three carbon atoms, or an alkyl group, which alkyl or aryl groups are substituted or unsubstituted with groups that do not interfere undesirably with polyurethane formation; each R^3 is independently a halogen-substituted alkyl group or a halogen atom; and R^4 is an alkyl group which is unsubstituted or substituted with groups which do not interfere undesirably with polyurethane formation; (d) polysubstituted alkyl diamines having at least one highly electronegative group geminate to each amine group; (e) alkyl acid esters of halogen substituted diamino phenols having a structure represented by Formula V:



wherein w is an integer in the range of about 0 to about 2 and x is an integer in the range of 1 to about 3, such that the sum of w and x is 3; each R^6 is independently hydrogen, an alkyl group having from one to about three carbon atoms, or an aryl group, which alkyl or aryl groups are unsubstituted or substituted with groups which do not interfere undesirably with polyurethane formation; each R^7 is independently a halogen-substituted alkyl group or a halogen atom; and R^8 is an alkyl group which is unsubstituted or substituted with groups which do not interfere undesirably with polyurethane formation; and (f) mixtures thereof.

4,931,488

DEGRADABLE PLASTIC COMPOSITIONS

André Chiquet, Villars sur Glane, Switzerland, assignor to Amrotex AG., Glarus, Switzerland

Filed Oct. 27, 1988, Ser. No. 266,834

Claims priority, application Switzerland, Feb. 27, 1987, 747/87

Int. Cl.[5] C08K *3/20*

U.S. Cl. 523—126 **6 Claims**

1. Thermoplastic composition, which is degradable under the action of heat and/or ultraviolet light and/or sunlight and/or composting conditions and which comprises as a polymeric compound thermoplastic polymers of α-olefins selected from the group consisting of polyethylene and ethylene copolymers, characterized in that the composition contains the following degradation-promoting additives:

(a) a biodegradable substance selected from the group consisting of natural starch, an etherified or esterified starch or a hydrophobically modified derivative thereof,

(b) $FeOH(stearate)_2$ as an iron compound which is soluble in the composition and which acts as an initiator and promotes further degradation, and

(c) an oxidizable substance which has one or more double bonds and acts as a degradation promoter and chain splitter, this substance being a fatty acid, a fatty acid ester or a mixture thereof.

4,931,489

FLUID LOSS CONTROL ADDITIVES FOR OIL WELL CEMENTING COMPOSITIONS

Clare H. Kucera, Grosse Ile; Stefano C. Crema, Ann Arbor; Michael D. Roznowski, Trenton, all of Mich.; Gerd Konrad, and Heinrich Hartmann, both of Limburgerhof, Fed. Rep. of Germany, assignors to BASF Corporation, Parsippany, N.J.

Division of Ser. No. 195,807, May 19, 1988, abandoned. This application Aug. 4, 1989, Ser. No. 389,649

Int. Cl.[5] C09K *7/00*

U.S. Cl. 523—130 **7 Claims**

1. A method of cementing a conduit in a borehole penetrating an earthen formation by introducing a cementing composition into the space between said conduit and said formation, wherein said cementing composition comprises:

(a) water;

(b) hydraulic cement; and

(c) a fluid loss additive in an amount effective to reduce fluid loss, said fluid loss additive consisting essentially of a copolymer of acrylamide monomers vinyl imidazole monomers and derivatives thereof, in a weight percent ratio of from about 95:5 to 5:95, said copolymer having a molecular weight range of from about 10,000 to 3,000,000, said acrylamide monomer selected from the group consisting of acrylamide, and acrylamide hydrolysis products, methacrylamide, N-N-dimethyl(meth)acrylamide, dialkylaminoalkyl(meth)acrylamide and mixtures thereof said vinylimidazole monomers selected from the group consisting of a basic vinyl heterocyclic monomer selected from the group consisting of 1-vinylimidazole, 2-vinylimidazole, 2-methyl-1-vinylimidazole, 4-methyl-1-vinylimidazole, 5-methyl-1vinylimidazole, 2-ethyl-1-vinylimidazole, 2-propyl-1-vinylimidazole, 2-isopropyl-1-vinylimidazole, 2-phenyl-1-vinylimidazole, 1-vinyl-4, 5-benzimidazole, 2-vinylpyridine, 4-vinylpyridine, 5-methyl-2-vinylpyridine and mixtures thereof.

4,931,490

EXPANDABLE POLYMER CONCRETES AND MORTARS UTILIZING LOW CURE TEMPERATURE POLYMERS

C. D. Armeniades, P.O. Box 1892, Houston, Tex. 77251

Continuation-in-part of Ser. No. 198,620, May 20, 1988, which is a continuation of Ser. No. 728,837, Apr. 30, 1985, abandoned, which is a continuation of Ser. No. 538,925, Oct. 4, 1983, abandoned. This application Dec. 7, 1988, Ser. No. 281,019

Int. Cl.[5] C08J 9/32

U.S. Cl. 523—218 20 Claims

1. A process for the production of a polymer concrete composition of controllable cure shrinkage, comprising:

(a) dispersing a substituted mineral additive, produced by the substitution of at least part of the water of hydration of said mineral additive with a composition of higher volatility than water, into a polymerizable resin composition in a quantity sufficient to achieve the desired cure shrinkage control in the mixture when the mixture solidifies;

(b) mixing particulate inorganic, filler with the resin composition containing the substituted mineral additive in an amount sufficient to obtain a raw polymer concrete or mortar of the desired consistency;

(c) curing the resin/additive/filler mixture at a temperature sufficient to cause said substituted mineral additive to expand as the resin polymerizes allowing the curing mixture to solidify.

4,931,491

COATING COMPOSITION EXHIBITING IMPROVED RESISTANCE TO ENVIRONMENTAL ATTACK

Ronald R. Savin, 10448 Chester Rd., Cincinnati, Ohio 45215

Filed Nov. 25, 1988, Ser. No. 276,397

Int. Cl.[5] C08K 3/36

U.S. Cl. 523—443 23 Claims

1. A coating composition for the protection of substrates against environmental attack, comprising, in weight percent:

from about 10% to about 30% of a film-forming polymer which is liquid at room temperature in the presence of not more than 25% by weight solvents;

up to about 20% of a corrosion inhibiting agent selected from the group consisting of metal chromates, metal phosphates, metal molybdates, and mixtures thereof;

from 2% to about 5.5% of an amorphous pyrogenic silica having an average particle size less than 0.01 micron;

from about 20% to about 50% of a crystalline silica having an oil absorption value of less than 20 measured by ASTM standard test D281-84; and

not greater than 25% of at least one solvent compatible with said polymer, said composition having a viscosity suitable for application of coatings by conventional equipment.

4,931,492

OLEFIN POLYMER COMPOSITIONS CONTAINING POLYORGANOSILOXANES AND THE USE THEREOF IN THE PRODUCTION OF FILM MATERIAL AND POLYORGANOSILOXANES

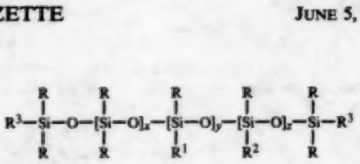
George N. Foster, Bloomsbury, N.J.; Herbert E. Petty, Bethel, Conn.; Charles H. Blevins, II, Beacon, and Roswell E. King, III, Pleasantville, both of N.Y., assignors to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.

Continuation-in-part of Ser. No. 176,081, Mar. 31, 1988, abandoned, and Ser. No. 176,090, Mar. 31, 1988, abandoned. This application Mar. 17, 1989, Ser. No. 322,968

Int. Cl.[5] C08K 5/54

U.S. Cl. 524—188 23 Claims

1. A composition comprising an olefin polymer and a polyorganosiloxane of the following nominal formula:



wherein

R, which may be the same or different, represents an alkyl group having from 1 to 4 carbon atoms;

R^1 represents the group $—R^4—(N)_b—(O)_c—R^5$

R^2 represents the group $—(CH_2)_d—R$ wherein R is as previously defined;

R^3, which may be the same or different, represents R or R^2;

R^4 represents a straight or branched chain alkylene group having 1 to 15 carbon atoms;

R^5 represents hydrogen; $(CH_2)_aCHOHCH_2OH$; or $[(CH_2)_eOH]_fH_{2-f}$;

a is an integer having a value of 1 to 15;

b has a value of 0 to 1;

c has a value of 0 to 1;

d is an integer having a value of 3 to 50;

e has a value of 1 or 2;

f has a value of 1 or 2;

x has a value ranging from about 1 to about 200;

y has a value ranging from about 1 to about 200; and

z has a value ranging from 0 to about 200; with the proviso that:

if R^5 is hydrogen or $(CH_2)_aCHOHCH_2OH$, b is 0 and c is 1; and

if R^5 is $[(CH_2)_eOH]_fH_{2-f}$, b is 1 and c is 0

wherein the polyorganosiloxane is present in an amount of about 0.005 to about 0.5 percent by weight based on the weight of the composition.

4,931,493

BENEFICIATED TALCS

Kenneth E. Weber, Pacific Palisades, Calif., assignor to Cyprus Mines Corporation, Englewood, Colo.

Division of Ser. No. 3,242, Jan. 14, 1987, Pat. No. 4,820,347. This application Sep. 23, 1988, Ser. No. 248,168

Int. Cl.[5] C08K 5/06

U.S. Cl. 524—375 10 Claims

1. A moldable thermoplastic resinous composition comprising:

(A) a beneficiated talc filler comprising a talc regarded, in the unbeneficiated states, as incompatible or unsuitable for use as a filler for thermoplastic resinous compositions, admixed with an effective amount of:

(a) one or a mixture or octyl-or nonylphenyl/poly(ethylene oxide) condensates, and

(b) one or a mixture of poly(ethylene glycols) or alkoxypoly(ethylene glycols); and

(B) a moldable -hermoplastic resin.

4,931,494

AQUEOUS POLYMER DISPERSIONS HAVING A LONG SHELF LIFE

Gerhard Auchter, Mannheim; Thomas Schwerzel, Ludwigshafen; Rolf Osterloh, Erftstadt; Gerhard Neubert, Battenberg; Peter Pfoehler, Speyer; Wolfgang Druschke, Dirmstein, and Helmut Jaeger, Bobenheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Jun. 23, 1988, Ser. No. 210,321

Claims priority, application Fed. Rep. of Germany, Jun. 24, 1987, 3720860

Int. Cl.[5] C08F 2/16

U.S. Cl. 524—460 20 Claims

1. An aqueous polymer dispersion which has a long shelf life and which comprises a mixture containing: of from 15 to 70% by weight of a copolymer (A) having as components:

(I) from 1.5 to 15% by weight of copolymerizable compounds

of 3 to 10 carbon atoms which contain in carboxyl or carboxylic anhydride group;
(II) from 65 to 98.5% by weight of C_1–C_{20}-alkyl acrylates or methacrylates;
(III) from 0 to 20% by weight of vinylaromatics;
(IV) from 0 to 20% by weight of copolymerizable carbonyl compounds selected from the group consisting of aldehydes, ketones and mixtures thereof; and
(V) from 0 to 10% by weight of further copolymerizable organic compounds not stated under (I) to (IV); and
from 30 to 85% by weight of a copolymer (B) having as components: from 60 to 100% by weight of the monomers (II); and from 0 to 40% by weight of one or more of the monomers (III) to (V), wherein the copolymers (A) and (B) are dispersed in water with ammonia and a polyhydrazide (C) and together contain more than 65% by weight of alkyl (meth)acrylates (II) whose homopolymers have glass transition temperatures of less than 0° C., and wherein one or both of the copolymers (A) and (B) contain the monomer(s) (IV) as components.

4,931,495

NON-AQUEOUS DISPERSION POLYMERIZATION

Richard A. Bafford, Aiken, S.C.; George E. Faircloth, Augusta, Ga., and Hseuh C. Lee, Baton Rouge, La., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Sep. 15, 1987, Ser. No. 96,656
Int. Cl.[5] C08F 2/16
U.S. Cl. 524—460 **20 Claims**

1. A polymerization process for preparing a stable dispersed polymer in a non-aqueous diluent which comprises polymerizing in a polar, aliphatic organic diluent
(a) at least one ethylenically unsaturated monomer capable of free radical addition polymerization;
(b) a polar monomer having a functional group selected from the group consisting of unsaturated carboxylic acids and substituted alkyl (meth)acrylate derivatives; and
(c) a polymeric monomer consisting of a linear, uniform molecular weight polymer having a polymerizable, ethylenically unsaturated group capable of polymerization with the ethylenically unsaturated monomer by a free radical addition process.

4,931,496

DAMAGE TOLERANT FIBER-REINFORCED COMPOSITES BASED ON CYANATE ESTER/UREA THERMOSETTING COMPOSITION

Shahid P. Qureshi, Piscataway; Hugh C. Gardner, and Richard H. Newman-Evans, both of Somerville, all of N.J., assignors to Amoco Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 250,838, Sep. 28, 1988, which is a division of Ser. No. 71,215, Jul. 8, 1987, Pat. No. 4,804,740. This application Mar. 24, 1989, Ser. No. 328,513
Int. Cl.[5] C08L 87/00
U.S. Cl. 524—612 **20 Claims**

1. A fiber-reinforced composition comprising:
(a) a thermosetting composition comprising 100 pbw of a cyanate ester and from about 0.5 to about 12 pbw of at least one urea compound having the structural formula $RR^1NCONR^2R^3$ wherein R and R^2 are independently selected from the group consisting of hydrogen and organo radicals, and R^1 and R^3 are independently selected organo radicals; and
(b) a reinforcing fiber.

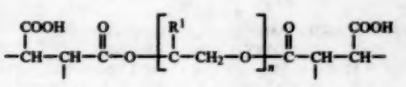
4,931,497

HYDROPHILIC SWELLABLE GRAFT POLYMERS FROM MALEIC ANHYDRIDE-ALKYLENE SUBSTRATE

Friedrich Engelhardt, and Ullrich Riegel, both of Frankfurt, Fed. Rep. of Germany, assignors to Cassella Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Oct. 28, 1988, Ser. No. 264,022
Claims priority, application Fed. Rep. of Germany, Nov. 13, 1987, 3738602
Int. Cl.[5] C08L 67/06
U.S. Cl. 525—42 **6 Claims**

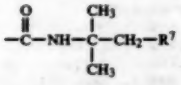
1. Hydrophilic swellable graft polymers which consists, in random distribution, to the extent of 0.5 to 20% by weight of said graft polymer, radicals of the general formula I


(I)

having grafted thereon, to the extent of 79 to 99% by weight of said graft polymer, radicals containing an acid group, of the general formula II

(II)

and to the extent of 0.1 to 2% by eight of crosslinking structures originating from monomers with at least two olefinically unsaturated double bonds, wherein
n denotes 2 to 300,
R^1 denotes hydrogen or methyl,
R^2 denotes hydrogen, methyl or ethyl,
R^3 denotes the carboxyl group, the group $-SO_3H$, the group $-PO_3R^8R^9$, wherein R^8 and R^9 denote independently from one another hydrogen or alkyl with 1 to 4 carbon atoms or a group of the formula



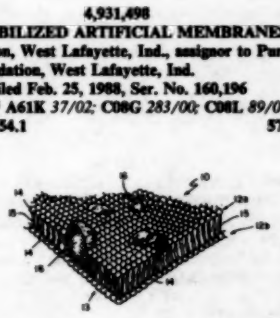
wherein R^7 stands for the group $-SO_3H$ or the group $-PO_3H_2$, and
R^4 denotes hydrogen, methyl, ethyl or the carboxyl group.

4,931,498

IMMOBILIZED ARTIFICIAL MEMBRANES

Charles Pidgeon, West Lafayette, Ind., assignor to Purdue Research Foundation, West Lafayette, Ind.

Filed Feb. 25, 1988, Ser. No. 160,196
Int. Cl.[5] A61K 37/02; C08G 283/00; C08L 89/00
U.S. Cl. 525—54.1 **57 Claims**



1. A composition of matter comprising
a particulate support material,

a synthetic membrane structure on the surface of said support material, said membrane structure comprising a hydrophilic outer portion and a hydrophobic inner portion and further comprising a layer of molecules of an amphiphilic compound, said molecules having hydrophilic and hydrophobic portions forming the outer and inner portions, respectively, of the membrane structure, said amphiphilic compounds selected from the group consisting of amphiphilic compound constituents of biological cell membranes and liposome-forming amphiphilic compounds, and

means for immobilizing the membrane structure on the surface of the support material.

4,931,499

RUBBER COMPOSITION DERIVED FROM FLUOROELASTOMER AND ETHYLENE-ALPHA-OLEFIN COPOLYMER RUBBER AND RUBBER ARTICLE FORMED THEREFROM

Masato Sakai, Suzuka; Itsuki Umeda, Mie; Yasuo Takeuchi, Yokkaichi, and Yasuhiko Takemura, Funabashi, all of Japan, assignors to Japan Synthetic Rubber Co., Ltd., Tokyo, Japan

Filed Nov. 18, 1988, Ser. No. 272,823

Claims priority, application Japan, Nov. 20, 1987, 62-291744

Int. Cl.[5] C08L *23/26, 27/14, 27/16, 27/18*

U.S. Cl. 525—194 **20 Claims**

1. A rubber composition obtained by subjecting a mixture of (I) 35–95 parts by weight of a fluoroelastomer and (II) 65–5 parts by weight of an ethylene-α-olefin copolymer rubber in which the total of the (I) component and the (II) component is 100 parts by weight and a crosslinking agent for the copolymer rubber (II) to reaction while imparting shearing deformation to the mixture.

4,931,500

HYDROLYZED ETHYLENE-VINYL ACETATE COPOLYMER

Shinji Okamoto, Kurashiki; Masaaki Minakawa, Hirakata; Youiti Neki, Kurashiki, and Masasi Nakagire, Kurashiki, all of Japan, assignors to Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Aug. 19, 1988, Ser. No. 234,109

Claims priority, application Japan, Oct. 2, 1987, 62-250362

The portion of the term of this patent subsequent to Aug. 15, 2006, has been disclaimed.

Int. Cl.[5] C08F *16/06*

U.S. Cl. 525—60 **3 Claims**

1. A hydrolyzed ethylene-vinyl acetate copolymer having an ethylene content of 20 to 60% by mole and a degree of hydrolysis in the vinyl acetate component of at least 95% by mole, having an ash content of not more than 20 ppm, an alkali metal content of not more than 5 ppm, and a free acid content of not more than 0.3 μeq/l, and having a ratio of the melt viscosity at 220° C. after maintaining said copolymer at 220° C. for 60 minutes to the melt viscosity at 220° C. after maintaining said copolymer at 220° C. for 5 minute at 1.0 to 1.5.

4,931,501

MODIFIED POLY(VINYL ALCOHOL) CONTAINING MORPHOLINOALKYLETHER GROUPS

Ta-Wang Lai, Novato, Calif.; Robert K. Pinschmidt, Jr., Allentown, Pa., and William F. Burgoyne, Jr., Emmaus, Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Oct. 20, 1989, Ser. No. 424,433

Int. Cl.[5] C08F *8/00*

U.S. Cl. 525—61 **12 Claims**

1. A modified poly(vinyl alcohol) containing morpholinoalkylether groups pendant from about 1 to 30 mol percent of the polymerized ethylene linkages in the polymer backbone.

4,931,502

DUCTILE, BLOW MOLDABLE COMPOSITION CONTAINING A STYRENE-MALEIMIDE COPOLYMER BEARING PENDANT CARBOXYL OR HYDROXYL GROUPS

Russell J. McCready, Downingtown, Pa., assignor to Arco Chemical Technology, Inc., Wilmington, Del.

Filed Oct. 11, 1988, Ser. No. 255,794

Int. Cl.[5] C08L *35/06, 67/02*

U.S. Cl. 525—64 **33 Claims**

1. A moldable composition which exhibits ductility upon molding comprising:

(a) a rubber modified styrene-maleic anhydride copolymer;

(b) a butadiene or acrylate based core-shell graft copolymer modified polybutylene terephthalate ester; and

(c) a styrene-maleimide copolymer having pendant carboxyl or hydroxyl groups,

wherein the weight ratio of copolymer (a) to polyester (b) is from about 65:35 to about 35:65, and the amount of copolymer (c) in parts by weight is from about 1 to about 20 parts per each 100 parts by weight of total (a)+(b)+(c).

4,931,503

COMPOSITION

Omar M. Boutni, Mt. Vernon; Linda H. Nelson; Dwight J. Patterson, both of Evansville, all of Ind.; Charles F. Pratt, AC Bergen Op Zoom, Netherlands, and Herman B. Savenije, LW Bergen Op Zoom, Netherlands, assignors to General Electric Company, Mt. Vernon, Ind.

Filed Dec. 28, 1988, Ser. No. 291,465

Int. Cl.[5] C08L *69/00*

U.S. Cl. 525—67 **11 Claims**

1. A composition comprising an admixture of

(a). an aromatic polycarbonate of intrinsic viscosity of from about 0.35 to about 0.41 dl/g, measured in methylene chloride at about 25° C., said aromatic polycarbonate chain terminated with an endcapping agent which provides the polycarbonate with improved ductility when compared to a paratertiary butyl phenol encapped polycarbonate of the same intrinsic viscosity;

(b). a core/shell copolymer comprising a conjugated diene with a Tg of less than or equal to −10° C. as the core, said core being about 50 to 90 wt. percent of the core/shell polymer, and grafted thereon a shell comprised of an alkylalkacrylate and a styrenic, the core/shell copolymer present in such quantities to render the said composition ductile in the room temperature ¼ inch thickness Notched Izod test system under ASTM D-256, and

(c). a flame retardant combination comprising a flame retardant salt, said combination in quantities sufficient to achieve for the composition a UL-94 V-0 V-1 rating in a molded part 90 mils thick.

4,931,504

THERMOPLASTIC COMPOSITIONS BASED ON POLYPHENYLENE ETHERS AND STYRENE-BUTADIENE POLYMERS PRODUCED BY EMULSION POLYMERIZATION

Hans Jadamus, Marl; Wilfried Ribbing, Dorsten, and Roland Feinauer, Marl, all of Fed. Rep. of Germany, assignors to Huls Aktiengesellschaft, Marl, Fed. Rep. of Germany

Division of Ser. No. 792,283, Oct. 28, 1985, Pat. No. 4,690,978. This application Mar. 20, 1987, Ser. No. 28,466

Claims priority, application Fed. Rep. of Germany, Nov. 20, 1984, 3442274

Int. Cl.[5] C08L *9/06, 25/04, 51/04, 71/04*

U.S. Cl. 525—68 **12 Claims**

1. A thermoplastic composition, comprising:

(A) a polyphenylene ether in an amount of from 15 to 95 parts by weight;

(B) a styrene resin other than a styrene-butadiene copolymer prepared by emulsion polymerization in which styrene is

present in said copolymer in an amount of >80 wt.%, present in a positive amount of up to 70 parts by weight

(C) a styrene-butadiene rubber obtained by emulsion polymerization in an amount of from 3 to 15 parts by weight; and,

(D) a styrene-butadiene copolymer prepared by emulsion polymerization, wherein the said styrene incorporated in the copolymer in an amount of >80 wt.%, the said styrene-butadiene copolymer being present in an amount of from 3 to 15 parts by weight.

4,931,505

COATING COMPOSITION

Nobuyuki Miyazaki; Masao Unoki, both of Yokohama, and Seiji Munekata, Tokyo, all of Japan, assignors to Asahi Glass Company Ltd., Tokyo, Japan

Filed Oct. 4, 1988, Ser. No. 252,978

Claims priority, application Japan, Oct. 5, 1987, 62-249950

Int. Cl.[5] C08L *27/12, 61/20*

U.S. Cl. 525—125 **20 Claims**

1. A coating composition comprising:

(A) a fluorine-containing copolymer having a fluorine content based on fluoroolefin of at least 10% by weight, and

(B) a fluorine-containing copolymer of a polyfluorocarbon chain-containing monomer with a hydrophilic group-containing monomer wherein said hydrophilic group is a member selected from the group consisting of a polyethylene glycol, a polyhydric alcohol fatty acid partial ester, a sulfonate, a sulfuric acid ester, a phosphoric acid ester, a quaternary ammonium salt, an amine salt and N-vinyl lactam.

4,931,506

ETHYLENE OXIDE/EPIHALOHYDRIN COPOLYMER ANTISTATIC ADDITIVE FOR CHLORINE-CONTAINING POLYMERS

Simon H. Yu, Westlake, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Continuation-in-part of Ser. No. 28,648, Mar. 20, 1987, abandoned. This application Jul. 15, 1988, Ser. No. 220,031

Int. Cl.[5] C08L *27/06, 27/08*

U.S. Cl. 525—187 **12 Claims**

1. An antistatic polymeric composition comprising a mixture of:

(a) a semicrystalline, antistatic copolymer additive of ethylene oxide and an epihalohydrin wherein the semicrystalline antistatic copolymer additive contains at least 60% by weight ethylene oxide, has an inherent viscosity as determined in 100 g of toluene at 25° C. in the range of about 0.2 ml/g to about 15.0 ml/g, and a heat of fusion in the range from about 3 calories per gram to about 25 calories per gram, said antistatic copolymer additive comprising from about 3% to about 20% by weight of the antistatic polymeric composition; and

(b) a polymeric material selected from the class consisting of polyvinyl chloride, other chlorine containing polymers, and mixtures thereof wherein the polymeric material comprises from about 80% to about 97% by weight of the antistatic polymeric composition.

4,931,507

COMPOSITION COMPRISING POLY(P-HYDROXYSTRENE) DERIVATIVE, EPOXY-MODIFIED POLYBUTADIENE AND AROMATIC MALEIMIDE

Katuo Sugawara, Hitachi; Akio Takahashi, Hitachiota; Junichi Katagiri, Ibaraki; Akira Nagai; Masahiro Ono, both of Hitachi, and Toshikazu Narahara, Ibaraki, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Nov. 2, 1988, Ser. No. 266,406

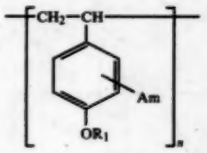
Claims priority, application Japan, Nov. 4, 1987, 62-277446

Int. Cl.[5] C08L *25/16, 63/08*

U.S. Cl. 525—193 **6 Claims**

1. A thermosetting resin composition comprising:

(a) a prepolymer of a poly(p-hydroxystyrene) derivative represented by the general formula



(I)

wherein A is a halogen group, R_1 is an alkenyl or alkenoyl group of 2 to 4 carbon atoms, m denotes a number of 1 to 4 and n denotes a number of 1 to 100,

(b) an epoxy-modified polybutadiene, and

(c) an aromatic maleimide compound.

4,931,508

CO-CURING OF NR/EPDM RUBBER BLENDS

Singa D. Tobing, Moline, Ill., assignor to Servus Rubber Company, Inc., Rock Island, Ill.

Continuation of Ser. No. 193,803, May 13, 1988, Pat. No. 4,882,387. This application Nov. 16, 1989, Ser. No. 418,232

Int. Cl.[5] C08L *7/00, 23/16, 23/20*

U.S. Cl. 525—194 **8 Claims**

1. An air-cured ozone resistant composition comprising a cured mixture containing by weight of total rubber, a range of about 70–55 parts natural rubber (NR) and about 30–45 parts of an ethylene propylene diene monomer elastomer (EPDM), said EPDM being divided between high molecular weight (MW) EPDM and low molecular weight (Mw) EPDM in the range of about 32–20 parts high NW and about 4–10 parts low MW EPDM, said high MW being defined as having an MN >50,000 and said low MN being defined as having an MN between 1,000 and 15,000; and, as curing agents, a range of about 0.64–1.6 phr of sulfur, about 0.5–1.0 phr of mercaptobenzothiasole disulfide, about 0.3–0.6 phr of diphenylquanidine and about 0.6–1.2 phr of organic peroxide.

4,931,509

CURABLE ACRYLATE-TYPE ELASTOMER COMPOSITION

Shigeru Yagishita, Kawasaki; Masatoshi Sugimoto, and Tomoaki Okita, both of Haruhi, all of Japan, assignors to Nippon Zeon Co., Ltd., Tokyo and Toyoda Gosei Co., Ltd., Aichi, both of, Japan

Filed Apr. 3, 1987, Ser. No. 33,795

Claims priority, application Japan, Apr. 8, 1986, 61-79115

Int. Cl.[5] C08L *9/02;* **C08F** *8/30, 8/14*

U.S. Cl. 525—208 **13 Claims**

1. A curable elastomeric composition comprising an epoxy group-containing acrylate-type elastomer in combination with (1) a polycarboxylic acid or its anhydride, (2) a quaternary ammonium or phosphonium salt and (3) a urea.

4,931,510

POLYMERS FROM ETHYLENIC MONOMERS

Günter Sackmann, Leverkusen; Joachim König, Odenthal, and Heinz Bäumgen, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

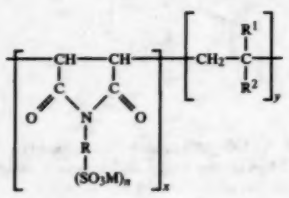
Filed Feb. 17, 1989, Ser. No. 312,089

Claims priority, application Fed. Rep. of Germany, Mar. 4, 1988, 3807097

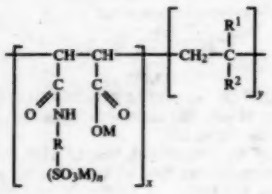
Int. Cl.[5] C08F 267/10, 20/10

U.S. Cl. 525—302 14 Claims

1. A polymer obtainable by subjecting at least one monomer selected from the group consisting of styrene, alpha-methylstyrene, acrylonitrile, vinyl acetate, ethyl acrylate, methyl methacrylate, n-butyl acrylate, i-butyl acrylate, 2-ethylhexylacrylate and oxypropyl methacrylate to a free-radical emulsion polymerization in the presence of a polymer of the formulae I and/or II



I



II

in which

M signifies a cation-forming radical,

n signifies 1 or 2,

R signifies an aliphatic radical having 1 to 10 carbon atoms or an aromatic radical having 1 to 10 carbon atoms,

R^1 signifies H or $-CH_3$,

R^2 signifies H, C_1–C_6-alkyl, and phenyl,

R^3 signifies a hydrocarbon radical of an amine and

x and y are selected in such a manner that the weight average of the molecular weight ($\overline{M}_w$) of the polymers I and II is 5,000 to 500,000 and the ratio of x:y is 1:4 to 1:1.

4,931,511

CROSS-LINKABLE COATING COMPOSITION

Shoji Kawachi, Nishinomiya; Masayasu Tomoda; Masahiko Oka, both of Otsu; Yasuyoshi Furukawa, Neyagawa, and Hiroyuki Tanaka, Settsu, all of Japan, assignors to Daikin Industries, Ltd., Osaka, Japan

Filed Sep. 16, 1988, Ser. No. 245,669

Claims priority, application Japan, Sep. 17, 1987, 62-235971

Int. Cl.[5] C08F 8/00, 16/24

U.S. Cl. 525—326.3 10 Claims

1. A cross-linkable coating composition comprising a fluorine-containing elastomeric copolymer which comprises (a) 50 to 95% by mole of repeating units derived from a fluoroolefin of the formula:

$$CF_2{=}CXY \qquad (I)$$

wherein X and Y are the same or different and are each a fluorine atom or a chlorine atom, (b) 50 to 5% by mole of repeating units derived from a perfluorovinyl ether of the formula:

$$R_f{-}[OCFZCF_2(CF_2)_m]_n{-}OCF{=}CF_2 \qquad (II)$$

wherein R_f is a C_1–C_6 perfluoroalkyl group, Z is a fluorine atom or a trifluoromethyl group, n is an integer of 0 to 5 and m is 0 or 1 provided that when m is 1 (one), X is not a trifluoromethyl group and a cross-linking agent for the copolymer, the copolymer and the cross-linking agent being dissolved or dispersed in a perfluorosolvent.

4,931,512

PROCESS FOR PRODUCING A THERMOSET RESIN

Shunichi Matsumura; Hiroo Inata; Hiroyuki Umetani, and Masuhiro Okada, all of Iwakuni, Japan, assignors to Teijin Limited, Osaka, Japan

Continuation-in-part of Ser. No. 137,950, Dec. 28, 1987, abandoned. This application Aug. 24, 1988, Ser. No. 235,523

Claims priority, application Japan, Dec. 26, 1986, 61-308515; Jan. 23, 1987, 62-12488; Mar. 27, 1987, 62-71861; May 14, 1987, 62-115920; Jul. 27, 1987, 62-185544; Aug. 3, 1987, 62-192556; Oct. 8, 1987, 62-252453; Oct. 9, 1987, 62-253767; Oct. 22, 1987, 62-265343

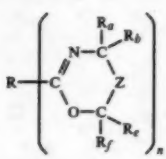
Int. Cl.[5] C08L 75/04

U.S. Cl. 525—333.3 41 Claims

1. A process for producing a thermoset resin, which comprises reacting

(A) an organic compound containing at least two groups selected from the class consisting of alcoholic hydroxyl groups, aromatic amino groups and aromatic aminomethyl groups, said organic compound being a monomer, an oligomer or a polymer, and

(B) a poly(cyclic iminoether) represented by the following formula (I)



(I)

wherein n is an integer of 2 to 4, R represents a hydrocarbon group having a valence of n which may be interrupted or substituted by an atom other than carbon or a group containing an atom other than carbon, Z represents a direct bond or a group of the formula

R_a, R_b, R_c, R_d, R_e and R_f are identical or different, and each represents a hydrogen atom, methyl, ethyl, propyl, phenyl, tolyl or benzyl with the proviso that when n is 2, R may also represent a direct bond,

with the proviso that when said organic compound (A) is a monomeric compound having at least two aromatic amino groups said poly(cyclic iminoether) is the compound represented by the formula (I) wherein Z represents the group of the formula

in the presence of

(C) a compound acting as an acid catalyst, at an elevated temperature.

4,931,513

POLYMERIC HYDRIDOSILAZANES AND PROCESSES FOR THEIR PREPARATION AND THEIR USE

Thomas Gerdau, Eppstein/Taunus; Hans-Jerg Kleiner, Kronberg/Taunus; Marcellus Peuckert; Martin Brück, both of Hofheim am Taunus, and Fritz Aldinger, Rodenbach, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

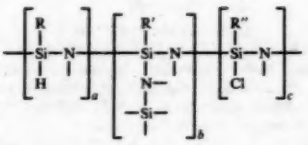
Filed Sep. 22, 1988, Ser. No. 247,933

Claims priority, application Fed. Rep. of Germany, Oct. 6, 1987, 3733728

Int. Cl.[5] C08F *283/00*

U.S. Cl. 525—474 10 Claims

1. A process for the preparation of a polymeric hydridosilazane, which comprises reacting a polymeric hydridochlorosilazane of the formula



in which the free valencies of the nitrogen atoms are saturated with H atoms or silyl radicals of the formula R*SiX-N<[(X=H, Cl or N<)], wherein X is H, Cl, or N<, and which R, R', R'' and R* denote alkyl groups with 1 to 6 carbon atoms and wherein a, b and c denote the molar fractions of the particular structural units and wherein the value of a, b, and c are each between 0.1 and 0.8 with NH_3.

4,931,514

ADMIXING METAL SALT PROMOTOR, INITIATOR AND (M)ETHYL ACETOACETATE TO CURE VINYL ESTERS

William D. Waters, 10231 South Quebec, Tulsa, Okla. 74137

Continuation of Ser. No. 916,022, Oct. 6, 1986, abandoned. This application Jun. 10, 1988, Ser. No. 205,549

Int. Cl.[5] C08G *59/16*; C08L *63/10*

U.S. Cl. 525—531 13 Claims

1. A method of accelerating the curing of a vinyl ester resin at essentially room temperature consisting of the steps of:

(a) admixing for every 100 parts by weight of a vinyl ester resin, from about 43 up to 100 parts by weight of a vinyl monomer, and from about 0.47 to about 0.71 parts by weight of a polyvalent metal salt promoter;

(b) adding to the admixture of step (a) an effective amount of a free radical initiator;

(c) adding to the admixture of step (a) an effective amount of an accelerator selected from the group consisting of a methyl acetoacetate and ethyl acetoacetate to accelerate the curing of the admixture of step (b) and

(d) curing the admixture of step (c) at essentially room temperature with a gel time under about ten minutes and a cured Barcol hardness within one hour.

4,931,515

METHOD FOR PRODUCING ENCAPSULATED SEMICONDUCTOR FROM IMPROVED EPOXY RESINS

Hisao Takagishi, Kyoto; Shuichi Kanagawa, Osaka; Kunimasa Kamio, Saita, and Kazuo Sumiyoshi, Oita, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Continuation of Ser. No. 778,159, Sep. 17, 1985, abandoned, which is a continuation of Ser. No. 593,242, May 26, 1984, abandoned. This application Dec. 8, 1988, Ser. No. 281,889

Claims priority, application Japan, Apr. 4, 1983, 58-59593

Int. Cl.[5] C08G *8/00*

U.S. Cl. 525—504 4 Claims

1. In a method for producing an encapsulated semiconductor which comprises encapsulating a semiconductor with an epoxy resin composition, said epoxy resin composition comprising a novolak type epoxy resin produced from a substituted-phenol novolak and epihalohydrin, the improvement wherein said epoxy resin is selected so as to have a hydroxyl group-containing substance content which corresponds to a maximum absorbance of 0.15 or less as measured in a 3% (W/V) dichloromethane solution of the epoxy resin by measuring the absorbance of said 3% (W/V) dichlormethane solution of the epoxy resin at a wave number of between 3570 and 3600 cm^{-1} with an infrared spectrophotometer having a cell of 2 mm length.

4,931,516

PROCESS FOR PRODUCING POLYARYLENE SULFIDE IN TITANIUM VESSEL WITH ADDITION OF WATER

Yo Iizuka; Takao Iwasaki; Takayuki Katto, and Zenya Shiiki, all of Iwaki, Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 79,999, Jul. 31, 1987, Pat. No. 4,812,539. This application Jan. 24, 1989, Ser. No. 300,938

Claims priority, application Japan, Aug. 4, 1986, 61-182989

Int. Cl.[5] C08G *75/16*

U.S. Cl. 526—62 3 Claims

1. A process for producing polyarylene sulfide having a melt viscosity of from 300 to 1,000 poise, as measured at 310° C. under a shear rate of 200 sec^{-1}, which comprises subjecting an alkali metal sulfide and a dihaloaromatic compound to dehalogenation and sulfidation reaction at a temperature of from 240° to 270° C. in the presence of water in an amount of from 0.5 to 5 mole per 1 kg of an aprotic organic polar solvent until the conversion of said dihaloaromatic compound in the polymerization system reaches from 70 to 98 mole %, thereby forming a polyarylene sulfide prepolymer having a melt viscosity of from 5 to 300 poise, as measured at 310° C. under a shear rate of 200 sec^{-1}, adding water to the resultant reaction mixture containing the polyarylene sulfide prepolymer so that from 6 to 15 mole of water is present per 1 kg of said solvent, and then continuing the reaction at a temperature of from 240° to 290° C., in which the reaction comprising said two steps is conducted for from 2 to 6 hours, and wherein said reaction is conducted in a reaction apparatus in which at least the parts in contact with the reaction solution are constituted with titanium material.

4,931,517

POLYMERIZATION OF ETHYLENE

Takashi Fujita, Yokkaichi, Japan, assignor to Mitsubishi Petrochemical Company Limited, Tokyo, Japan

Filed Aug. 12, 1988, Ser. No. 231,400

Claims priority, application Japan, Aug. 14, 1987, 62-202850

Int. Cl.[5] C08F *4/66*, *10/02*

U.S. Cl. 526—128 10 Claims

1. A process for polymerizing ethylene alone or in combination with an α-olefin, which comprises:

contacting ethylene or said ethylene α-olefin combination with a catalyst at a room temperature ranging from 125°-300° C. under a pressure of from 1-3000 kg/cm^2 for the production of low-pressure polymer material or at a

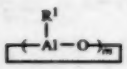
pressure ranging from 200–3000 kg/cm^2 for the preparation of high-pressure polymer material, said catalyst comprising the combination of:

(A) a metallocene compound of the formula:

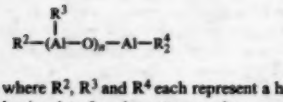
$$(CpR_m)_a R'_b(CpR_m) MX_{c-(a+1)} \quad (I)$$

wherein the moiety (CPR_m) represents cyclopentadienyl or a substituted cyclopentadienyl group in which each R, which may be the same or different, is hydrogen, a monovalent hydrocarbyl group having 1 to 20 carbon atoms or a 4- to 6-membered ring sharing two carbon atoms of the cyclopentadienyl moiety Cp; R' is a divalent group which links the groups (CpR_m)$_a$ and (CpR_m) and which is selected from the group consisting of an alkylene group having 1 to 4 carbon atoms, an alkylsilicon having 1 to 4 carbon atoms in each of the alkyl moieties thereof, an alkylgermanium having 1 to 4 carbon atoms in each of the alkyl moieties thereof, an alkylphosphine having 1 to 4 carbon atoms in each of the alkyl moieties thereof, and an alkylamine having 1 to 4 carbon atoms in each of the alkyl moieties thereof; X, each of which may be the same or different from each other, represents hydrogen, a monovalent hydrocarbyl group having 1 to 20 carbon atoms or a halogen atom; M represents a transition metal of the Group IVB, VB or VIB of the Periodic Table; c represents a valence of the transition metal M, b is 0 or 1; a is 0, 1 or 2, provided that when a is 0, b is 0, when b is 1, m is 4, and b is 0, m is 5;

(B) an aluminoxane of the formula:



where R^1 represents a hydrocarbyl group having 1 to 8 carbon atoms and m represents an integer of 2 to 100 or of the formula:



where R^2, R^3 and R^4 each represent a hydrocarbyl group having 1 to 8 carbon atoms and n represents a number of from 2 to 100; and

(C) a silicon compound containing an Si—O—C bond of the formula:

$$R^5_{4-n}SiY_n$$

wherein R^5 represents a hydrocarbyl group having 1 to 10 carbon atoms, Y represents a group OR^6 or $OCOR^7$ where R^6 and R^7, which are the same or different from R^5, each represent a hydrocarbyl group having 1 to 10 carbon atoms, and n, is a number satisfying the expression $0<n\leqq 4$, R^5's, when 4−n is 2 or larger, being the same or different from each other, thereby producing a polymer of ethylene or ethylene and said α-olefin which has an MFR value lower than that which would be obtained if catalyst component (C) is not present in the catalyst; the ratio of component (B) to component (A) ranging from 1 to 5000, based on the ratio of aluminum in component (B) to the transition metal component of component (A), and the amount of component (C) in the catalyst ranging from 0.01–1 as expressed in terms of the atomic ratio of Si in component (C) to Al in component (B).

4,931,518

LOW MOLECULAR WEIGHT COPOLYMERS OF VINYL HALIDE/VINYL ACETATE PRODUCED BY AQUEOUS POLYMERIZATION WITH MERCAPTAN

Zaev Sharaby, Cleveland Heights, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Filed Apr. 21, 1986, Ser. No. 854,204
Int. Cl.^{5} C08F *2/38, 2/20*
U.S. Cl. 526—211 9 Claims

1. A process for the production of low molecular weight copolymers of vinyl or vinylidene halides and vinyl esters of acids, said acids having 2 to 3 carbon atoms, by aqueous polymerization, comprising (a) the use of up to about 25 parts by weight of vinyl esters of said acids per 100 parts by weight of vinyl or vinylidene halide monomer, as a comonomer, and (b) the use of from about 0.03 to about 5.00 parts by weight per 100 parts monomer of a water soluble or insoluble mercaptan as a chain transfer agent, wherein the mercaptan is admixed with said vinyl esters before adding said mercaptan to the polymerization medium, and wherein at least 0.5 parts by weight of said mercaptan is added in the form of a mixture with vinyl ester to the polymerization medium prior to the start of the polymerization reaction, and wherein less than about 2.0 parts by weight of dispersant is present per 100 parts by weight of monomer.

4,931,519

COPOLYMERS FROM N-ALKYL-3-ALKENYLENE-2-PYRROLIDONE

Suk-Zu Song, Flanders; Surendra C. Mehta, Randolph; Kuchi S. Murthy, Morris Plains; Russell U. Nesbitt, Somerville, and Mahdi B. Fawzi, Flanders, all of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Division of Ser. No. 57,467, Jun. 2, 1987, Pat. No. 4,851,545.
This application May 5, 1989, Ser. No. 347,630
Int. Cl.^{5} C08F *26/06*
U.S. Cl. 526—258 1 Claim

1. A copolymer of N-isopropyl-3-methylene-2-pyrrolidone and 2-hydroxyethylmethacrylate having an equilibrium water concentration of 36.5% by weight at room temperature.

4,931,520

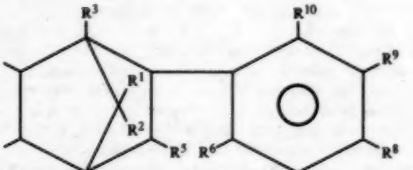
RANDOM COPOLYMER CONTAINING DERIVATIVE OF BICYCLO [2.2.1] HEPT-2-ENE COMPOUND

Teruaki Yamanashi; Hiroyuki Ozawa; Hitoshi Yuasa; Mitsuo Matsuno, all of Yokohama, and Tetsuo Satoh, Tokyo, all of Japan, assignors to Nippon Oil Co., Ltd., Tokyo, Japan

Filed Jan. 17, 1989, Ser. No. 298,180
Claims priority, application Japan, Jan. 20, 1988, 63-10068
Int. Cl.^{5} C08F *2/06, 32/04*
U.S. Cl. 526—281 15 Claims

1. A random copolymer comprising:

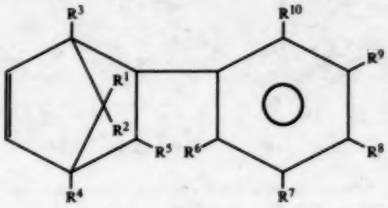
(a) recurring units each having the formula of:



wherein R^1 to R^{10} each represent the same or different atoms or groups and stand for a hydrogen atom or an alkyl group with or without R^5 being bonded to R^6 or R^{10} via an alkylene group having 1 to 3 carbon atoms,

(b) said random copolymer being obtained by copolymerizing ethylene with a feed monomer material comprising a

5-aryl-bicyclo [2.2.1] hept-2-ene compound represented by the formula of:



wherein R^1 to R^{10} are the same as above,

(c) said random copolymer containing 50 to 90 mol % of ethylene,

(d) said random copolymer having an intrinsic viscosity [η] of 0.3 to 10 dl/g measured in decahydronophthalene at 30° C., and

(e) said random copolymer having a glass transition temperature (Tg) of 80° to 220° C. measured by a thermomechanical analyzer.

4,931,521

OPTICAL MATERIALS COMPOSED OF RESIN FROM THIOACRYLAT ESTERS

Tatsuhito Matsuda, Kobe; Yasuaki Funae; Masahiro Yoshida, both of Saita, and Tsuguo Takaya, Ohtsu, all of Japan, assignors to Nippon Shokubai Kagaku Kogyo Co., Ltd., Osaka, Japan

Division of Ser. No. 138,041, Dec. 28, 1987, abandoned. This application Oct. 3, 1988, Ser. No. 253,340

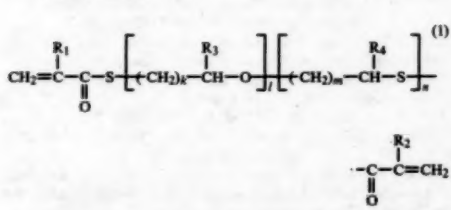
Claims priority, application Japan, Dec. 26, 1986, 61-308337; Apr. 28, 1987, 62-103017; Oct. 30, 1987, 62-273270

Int. Cl.[5] C08F *20/38*

U.S. Cl. 526—286 **5 Claims**

1. An optical material prepared from a resin having a high refractive index produced by radically polymerizing a material monomer, said material monomer comprising:

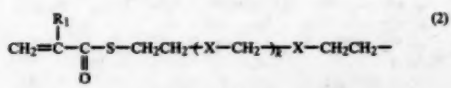
[I] at least one polymerizable polyfunctional thioacrylate or polyfunctional thiomethacrylate represented by the general formula (1)



(1)

wherein R_1 and R_2 represent H or CH_3, R_3 and R_4 independently represent H, CH_3 or OH, k and m independently represent an integer of 1 to 5, and l and n independently represent 0 or an integer of 1 to 4,

the general formula (2)



(2)

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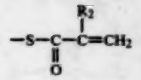
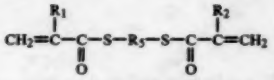


wherein R_1, R_2 and k are the same as defined in the general formula (1), and X represents 0 or S, or

the general formula (3)



(3)

wherein R_1 and R_2 are the same as defined in the general formula (1), and R_5 represents a phenylene group, a xylylene group, a nucleus-substituted phenylene group or a nucleus-substituted xylylene group; and

optionally [II] at least one other polymerizable monomer which is radically polymerizable with said polymerizable monomer [I].

4,931,522

COPOLYMERS OF POLYALKYLENE GLYCOL ACRYLATE AND A SALT OF A QUARTERNIZED ACRYLATE

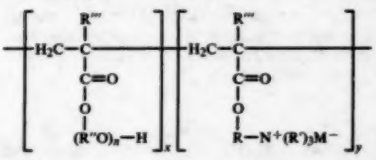
Robert Catena, 224 Baldwin Ter., Orange, N.J. 07050

Filed Jul. 11, 1989, Ser. No. 378,356

Int. Cl.[5] C08F *20/04*

U.S. Cl. 526—292.2 **12 Claims**

1. A copolymer of a polyalkylene glycol acrylate and a salt of a quaternized acrylate having the formula, wherein said formula is representative of the repeating structure of entire said copolymer:



wherein:

n=5–20;

x=6–13;

y=20–30, wherein x/y represents the ratio of the amount of polyalkylene glycol acrylate to the amount of the salt of quaternized acrylate;

R=an alkylene group of 1 to 5 carbon atoms;

R'=hydrogen or an alkyl group of 1 to 5 carbon atoms;

R''=an alkylene group of 1 to 5 carbon atoms;

R'''=hydrogen or an alkyl group of 1 to 5 carbon atoms; and

M^-=an chloride ion.

4,931,523

PLASTIC LENS

Nobuhiro Watanabe, Matsudo, and Teruo Sakagami, Nerima, both of Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Japan

Filed May 4, 1988, Ser. No. 190,121

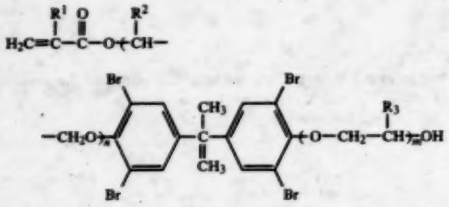
Claims priority, application Japan, May 12, 1987, 62-113576

Int. Cl.[5] C08F *220/22*

U.S. Cl. 526—292.3 **7 Claims**

1. A plastic lens made of a copolymer which has been obtained by copolymerizing 10–80 wt. % of a first monomer represented by the general formula (I) given below and 20–90

wt. % of a second monomer copolymerizable with the first monomer; General formula (I):



wherein R^1, R^2 and R^3 mean individually a hydrogen atom or methyl group, and n and m denote integers of 0–4 in total.

4,931,524

SURFACE-TREATMENT OF SYNTHETIC OR SEMI-SYNTHETIC FIBER TEXTILE MATERIALS

Kazuo Sato, and Masahiro Komori, both of Kyoto, Japan, assignors to Dai-Ichi Kogyo Seiyaku Co., Ltd., Kyoto, Japan

Filed Feb. 17, 1987, Ser. No. 15,196

Int. Cl.[5] C08G *18/00, 18/10, 18/70, 18/81*

U.S. Cl. 527—301 **14 Claims**

1. A composition for use in surface-treating synthetic or semi-synthetic fiber textile materials comprising an aqueous solution or dispersion of a thermally reactive saccharide/urethane ether having at least one blocked isocyanate group capable of regenerating free isocyanate function upon heating and at least one hydrophilic moiety, said saccharide component being selected from the group consisting of oligo- and polysaccharides, lower alkyl ethers thereof, hydroxy-lower alkyl ethers thereof, lower alkyl/hydroxy-lower alkyl ethers thereof and ionizable group-substituted lower alkyl ethers thereof, said saccharide/urethane ether being formed by etherifying said saccharide component with an etherifying agent having said blocked isocyanate group which is, in turn, a reaction product of a polyisocyanate compound with (a) a blocking agent and (b) a lower alkylene halohydrin or an adduct of epihalohydrin with a lower alkylene oxide.

4,931,525

OPTICAL ACTIVE (METH)ACRYLAMIDES AND POLYMERS THEREOF FOR RACEMATE RESOLUTION

Ulrich Schwartz; Rolf Grosser, both of Leverkusen; Karl-Erwin Piejko, Cologne; Bruno Bömer, Bergisch Gladbach, and Dieter Arlt, Cologne, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

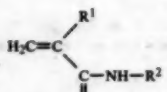
Division of Ser. No. 925,340, Oct. 31, 1986, abandoned, which is a continuation-in-part of Ser. No. 904,734, Sep. 5, 1986, abandoned. This application Nov. 21, 1988, Ser. No. 274,063

Claims priority, application Fed. Rep. of Germany, Sep. 11, 1985, 3532356

Int. Cl.[5] C08F *120/54;* **C07C** *103/133*

U.S. Cl. 526—305 **11 Claims**

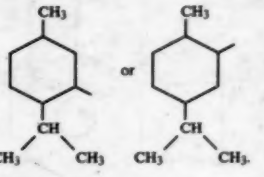
1. An optically active (meth)acrylamide monomer of the formula



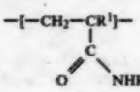
in which

R^1 represents hydrogen or methyl, and

R^2 represents one of the stereoisomers of the eight possible stereoisomeric forms of each of the optically active radicals of the formulae



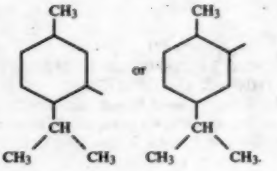
6. An optically active and vinyl cross-linked polymer containing the repeating structural unit



in which

R^1 represents hydrogen or methyl, and

R^2 represents one of the stereoisomers of the eight possible stereoisomeric forms of each of the optically active radicals of the formulae



4,931,526

α-OLEFINIC RANDOM COPOLYMER AND PRODUCTION PROCESS THEREOF

Junichi Yoshitake, Ichihara; Hiroaki Kitani, Kuga; Takeshi Muranaka, Iwakuni; Akira Mizuno, Saeki, and Norio Kashiwa, Iwakuni, all of Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan

Filed Nov. 10, 1988, Ser. No. 269,577

Claims priority, application Japan, Nov. 13, 1987, 62-285613

Int. Cl.[5] C08F *36/20*

U.S. Cl. 526—336 **4 Claims**

1. An α-olefinic random copolymer comprising: 70% to 99.9% by weight of a recurring unit (a) from a branched α-olefin having 5 to 10 carbon atoms, said branch at the 3-position or higher, and 0.1% to 30% by weight of a recurring unit (b) from an α,ω-nonconjugated diene having 6 to 20 carbon atoms, wherein said copolymer has:

(i) an inherent viscosity [η], measured in decalin at 135° C., of from 0.5 to 10 dl/g;

(ii) a crystallinity [Xc], measured by an X-ray diffraction method, of from 14% to 50%;

(iii) a glass transition temperature of from 30° C. to 60° C.; and

(iv) an iodine value of from 0 to 10.

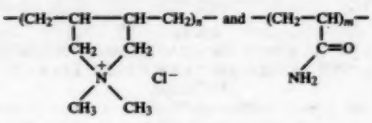
4,931,527

WATER SOLUBLE GRAFT COPOLYMERS OF LIGNIN, METHODS OF MAKING THE SAME AND USES THEREFORE

John J. Meister, 31675 Westlady Rd., Beverly Hills, Mich. 48010-5624

Filed Dec. 19, 1988, Ser. No. 286,344
Int. Cl.[5] C08G 59/00; C09K 7/00
U.S. Cl. 527—400 27 Claims

1. A positively-charged water-soluble graft copolymer of lignin with a neutralizing anion, having a central lignin network and at least one grafted side chain having randomly repeating units of the formulas:



wherein the ratio of such repeating units ranges from about 0.5 molar percent to about 99.5 molar percent, and from about 0.5 molar percent to about 99.5 molar percent, respectively, such that the central lignin network has a molecular weight of about 1,000 to 150,000 and the total number of randomly repeating units in the grafted side chain or chains is in the range of 5 to 300,000 units, and such that the total graft copolymer molecular weight is in the range of 1,000 to 30,000,000.

4,931,528

1-ISOPROPYL-2-METHYL IMIDAZOLE AS AN EPOXY RESIN CURATIVE

Harold G. Waddill; George P. Speranza, and Wei-Yang Su, all of Austin, Tex., assignors to Texaco Chemical Company, White Plains, N.Y.

Filed May 8, 1989, Ser. No. 348,824
Int. Cl.[5] C08G 59/68, 59/50
U.S. Cl. 528—94 5 Claims

1. An epoxy resin curative composition characterized by lower reactivity at ambient temperatures and increasingly accelerated reactivity at moderately elevated temperatures, comprising:

(1) 1 to 5 parts by weight of 1-isopropyl-2-methyl imidazole, and

(2) 100 parts by weight epoxy resin.

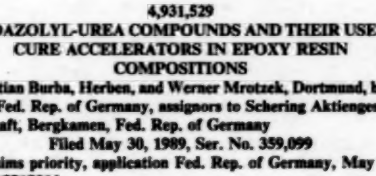
4,931,529

IMIDAZOLYL-UREA COMPOUNDS AND THEIR USE AS CURE ACCELERATORS IN EPOXY RESIN COMPOSITIONS

Christian Burba, Herben, and Werner Mrotzek, Dortmund, both of Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Bergkamen, Fed. Rep. of Germany

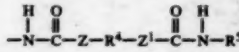
Filed May 30, 1989, Ser. No. 359,099
Claims priority, application Fed. Rep. of Germany, May 28, 1988, 3818214
Int. Cl.[5] C08G 59/44
U.S. Cl. 528—94 27 Claims

1. A compound of the formula



wherein R is an aliphatic group, cycloaliphatic group, aryl group or araliphatic group and

R^1 and R^2 are each independently hydrogen, lower alkyl or aryl, R^3 is a chemical bond or



Z and Z^1 are independently O or NH;

R^5 is R;

R^4 is lower aliphatic, arylene, aryl lower alkylene or cycloaliphatic,

wherein the aliphatic group contains up to 10 carbon atoms in the principal chain and up to a total of 15 carbon atoms;

the cycloaliphatic group contains up to 10 ring carbon atoms and up to a total of, 15 carbon atoms; and

the aryl group is an aromatic group containing from 6 to 10 ring carbon atoms and up to a total of 15 carbon atoms.

11. A method of curing in a curable mixture comprising epoxy resins and dicyandiamides which comprises treating the curable mixture with a catalytically effective amount of an accelerator compound of claim 1 to accelerate the hardening of the epoxy resin.

4,931,530

NOVEL AROMATIC POLYETHER AND A PROCESS FOR PRODUCING AN ETHER

Isaburo Fukawa, and Tsuneaki Tanabe, both of Fuji, Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 114,744, Oct. 30, 1987, abandoned. This application Sep. 20, 1989, Ser. No. 410,029
Claims priority, application Japan, Nov. 20, 1986, 61-275312; Apr. 9, 1987, 62-85708; Apr. 9, 1987, 62-85709
Int. Cl.[5] C08G 8/02, 14/00
U.S. Cl. 528—125 16 Claims

1. A process for producing an aromatic (poly)etherketone or an aromatic (poly)ethersulfone which comprises reacting an aromatic halogen compound containing at least one active halogen group represented by formula

—Y—Ar—X,

wherein Y denotes a ketone group or a sulfone group; Ar denotes a phenylene group or a nuclear-substituted product thereof; and X denotes a halogen atom, the halogen atom being bonded at the ortho- or para-position relative to Y, with a salt of an alkali metal, in which said salt is an alkali metal carbonate, bicarbonate, phosphate, stannate or mixtures thereof, to form the aromatic (poly)etherketone or aromatic (poly)ethersulfone having an ether group represented by the formula —Y—Ar—O—Ar—Y—.

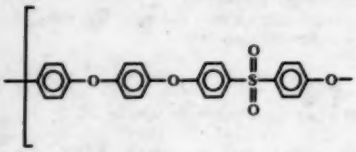
4,931,531

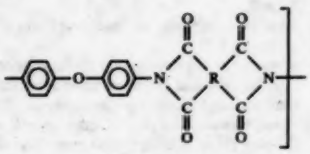
POLYIMIDE AND HIGH-TEMPERATURE ADHESIVE THEREOF

Shoji Tamai; Masahiro Ohta, both of Yokohama; Saburo Kawashima, Yokosuka; Katsuaki Ilyama, Odawara; Hideaki Oikawa, Yokohama, and Akihiro Yamaguchi, Kamakura, all of Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan

Filed Jun. 24, 1988, Ser. No. 210,789
Claims priority, application Japan, Jul. 2, 1987, 62-163940; Jul. 2, 1987, 62-163941
Int. Cl.[5] C08G 8/02, 14/00, 8/04, 69/26
U.S. Cl. 528—172 10 Claims

1. A polyimide consisting essentially of recurring units of the formula:





where R is a tetra-valent radical selected from the group consisting of an aliphatic radical having 2 or more carbon atoms, alicyclic radical, monoaromatic radical, condensed polyaromatic radical, and non-condensed polyaromatic radical wherein aromatic radicals are linked to one another directly or via a bridge member.

4,931,532

METHOD OF SYNTHESIS OF THERMOPLASTIC AROMATIC BENZOXAZOLE POLYMERS

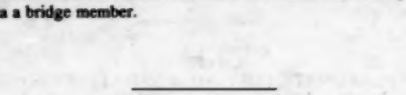
Bruce A. Reinhardt, New Carlisle, Ohio, assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Sep. 8, 1988, Ser. No. 241,645

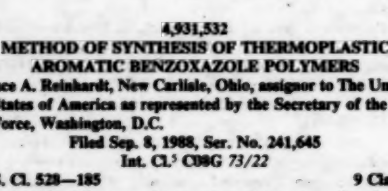
Int. Cl.[5] C08G 73/22

U.S. Cl. 528—185 **9 Claims**

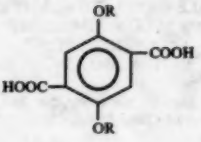
1. A method for preparing an aromatic benzoxazole polymer having repeating units of the formula



wherein Ar is



wherein R is an alkyl group having 8 to 12 carbon atoms, which comprises reacting 4,4'-hexafluoroisopropylidene bis-(2-aminophenol) with an aromatic dicarboxylic acid selected from the group consisting of isophthalic acid, terephthalic acid, 2,5-pyridine dicarboxylic acid, 2,6-pyridine dicarboxylic acid and a 2,5-bis(alkoxy) terephthalic acid of the formula



wherein R is an alkyl group having 8 to 12 carbon atoms, under reaction conditions in a reaction medium consisting essentially of a halogenated hydrocarbon solvent and a dehydrating agent, and recovering said polymer.

4,931,533

FILAMENT-, FIBER- OR FILM-FORMING AROMATIC COPOLYAMIDE FROM AROMATIC DIAMINE MIXTURE

Friedrich Herold, Hofheim am Taunus, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany

Filed Dec. 29, 1988, Ser. No. 291,503

Claims priority, application Fed. Rep. of Germany, Dec. 31, 1987, 3744601

Int. Cl.[5] C08G 69/32

U.S. Cl. 528—185 **16 Claims**

1. A filament -, fiber- and film-forming aromatic copolyamide of the dicarboxylic acid/diamine type consisting sentially of the recurring structural units of formulae

A: —CO—Ar—CO—

B: —NH—Arl—NH—

C: —NH—A2—NH—

D: —NH—Ar^3—Z—Ar^3—NH—

wherein:

—Ar—, —Ar^1— and —Ar^3— are each a divalent aromatic radical of 6 to 12 carbon atoms where the bonds are in the p-or a comparable coaxial or parallel position; —Ar^2— is a divalent aromatic radical where the bonds are in the m- or a comparable angled position;

—Z— is a grouping —O—Ar—O where —Ar— is as defined above;

and the composition of B, C and D, which are diamines, is within a mole percent area, based on the total number of moles of the diamines B, C and D, which is defined by corner points Q, R, S and T where:

Point Q is 15 mol-% of B, 80 mol-% of C, 5 mol-% of D

Point R is 60 mol-% of B, 35 mol-% of C, 5 mol-% of D

Point S is 60 mol-% of B, 10 mol-% of C, 30 mol-% of D

Point T is 15 mol-% of B, 32.5 mol-% of C, 52.5 mol-% of D

and having a Staudinger index [η] within the range from 50 to 1000 cm^3/g, measured in 96% strength H_2SO_4 at 25° C.

4,931,534

THERMOTROPIC AROMATIC POLYESTERS, A PROCESS FOR THEIR PRODUCTION AND THEIR USE FOR THE PRODUCTION OF MOLDINGS, FILAMENTS, FIBERS AND FILMS

Ralf Pakull; Volker Eckhardt; Joachim Genz; Karsten Idel, all of Krefeld; Hans-Rytger Kricheldorf, and Volker Döring, both of Hamburg, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen-Bayerwerk, Fed. Rep. of Germany

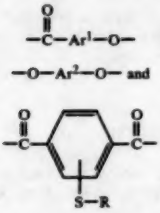
Filed Apr. 26, 1989, Ser. No. 343,345

Claims priority, application Fed. Rep. of Germany, May 6, 1988, 3815521

Int. Cl.[5] C08G 63/02, 63/18, 63/68

U.S. Cl. 528—193 **7 Claims**

1. Thermotropic aromatic polyester containing recurring units corresponding to the following formulae



(I)

(II)

(III)

in which

Ar^1 and Ar^2 are difunctional aromatic radicals containing 8 to 16 C atoms, in which at least 90 mol-% of the chain-extending bonds are coaxially or parallel-opposed and at most 10 mol-% are angled, these radicals optionally being substituted by 1 to 4 C_1–C_4 alkoxy groups and/or 1 to 4 halogen atoms, and

is an aryl radical containing 6 to 18 carbon atoms, a p-alkylphenyl radical containing 7 to 11 carbon atoms or a p-halophenyl radical,

characterized in that the molar ratio of I to II is 0 -85:100-15 and the molar ratio of II to III is 1- 95:1-1.05.

4,931,535

PROCESS FOR THE PREPARATION OF ACETAL POLYMER OR COPOLYMER

Kaoru Yamamoto; Toshiaki Kitano, and Hiroyuki Sano, all of Shizuoka, Japan, assignors to Polyplastics Co., Ltd., Osaka, Japan

Filed May 1, 1989, Ser. No. 346,560

Claims priority, application Japan, Jun. 13, 1988, 63-145445

Int. Cl.[5] C08G 2/06

U.S. Cl. 528—230 **6 Claims**

1. A process for the preparation of an acetal polymer or copolymer which comprises polymerizing formaldehyde or a cyclic oligomer thereof as a principal monomer, or copolymerizing said principal monomer with a comonomer copolymerizable therewith, using an isopoly acid or an acid salt thereof as a polymerization catalyst.

4,931,536

HYDROXY FUNCTIONAL ACRYLAMIDOMETHYL AMINO RESINS

William F. Pfohl, Wilbraham, Mass., assignor to Monsanto Company, St. Louis, Mo.

Filed May 27, 1988, Ser. No. 199,419

Int. Cl.[5] C08G 59/00, 12/32

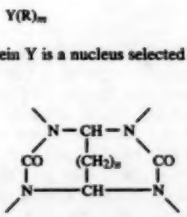
U.S. Cl. 528—250 **12 Claims**

1. A hydroxy functional acrylamido amino resin composition represented by the formula

$$Y(R)_m$$

wherein Y is a nucleus selected from the group consisting of:

(a)



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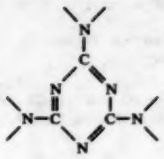
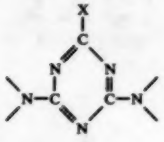
(b)

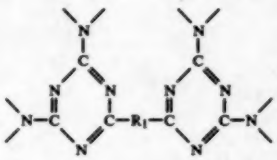


(c)



and

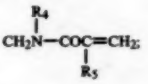
(d)



wherein R is selected from the group consisting of:

$(CH_2O)_pR_2$; A.

CH_2OR_3; B.



C.

and

$(CH_2O)_qCH_2R_6$; D.

wherein R_1 is a C_1 to C_{10}, linear or branched or cyclic, saturated or unsaturated divalent hydrocarbyl radical;

wherein R_2 is H, or a C_1 to C_{10}, linear or branched or cyclic, saturated or unsaturated aliphatic or aromatic monovalent hydrocarbyl radical but not more than one R_2 per Y nucleus is H;

wherein R_3 is a C_2 to C_{10} linear or branched or cyclic, hydrocarbyl radical substituted with at least one hydroxy;

wherein R_4 and R_5 are independently selected from hydrogen and methyl;

wherein R_6 is

$$[Y(R)_{m-2} - (CH_2O)_r - CH_2]_r - Y(R)_{m-1};$$

wherein X is a C_1 to C_{10} linear or branched or cyclic, saturated or unsaturated aliphatic or aromatic monovalent hydrocarbyl radical;

wherein m is the equivalence of the Y nucleus and is in the range of 4 to 12;

wherein n, p, q and r are independently selected in the range of 0 to 1;

wherein the average s is in the range of 0 to 2;

wherein the average number of A groups per Y nucleus is in the range of 0 to 3, the average number of B groups is in the range to provide from 0.3 to 10 hydroxy substituents per molecule, the average number of C groups is in the range of 2 to 10 per molecule and wherein the average number of Y nuclei per molecule is in the range of about 1 to about 4.

4,931,537

POLYGLYCIDAMIDE COATING COMPOSITIONS

William F. Pfohl, Wilbraham, Mass., assignor to Monsanto Company, St. Louis, Mo.

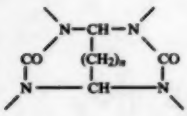
Filed May 27, 1988, Ser. No. 199,559
Int. Cl.[5] C08G 59/00, 12/32
U.S. Cl. 528—250 **24 Claims**

1. A curable composition an epoxy reactant and a hydroxy functional polyglycidamide composition represented by the formula

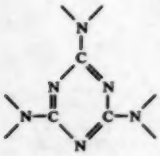
$$Y(R)_m$$

wherein Y is a nucleus selected from the group consisting of:

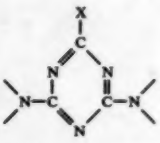
(a)



(b)

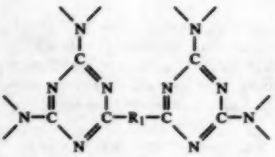


(c)



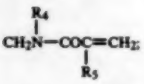
and

(d)

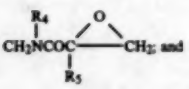


wherein R is selected from the group consisting of:
A. $(CH_2O)_pR_2$;
B. CH_2OR_3;

C.



D.



and

E. $(CH_2O)_qCH_2R_6$;

wherein R_1 is a C_1 to C_{10}, linear or branched or cyclic, saturated or unsaturated or epoxidized, divalent hydrocarbyl radical;

wherein R_2 is H, or a C_1 to C_{10}, linear or branched or cyclic, saturated or unsaturated or epoxidized, aliphatic or aromatic monovalent hydrocarbyl radical but not more than one R_2 per Y nucleus is H;

wherein R_3 is a C_2 to C_{10} linear or branched or cyclic, hydrocarbyl radical substituted with at least one hydroxy;

wherein R_4 and R_5 are independently selected from hydrogen and methyl;

wherein R_6 is

$$[Y(R)_{m-2}—(CH_2O)_r—CH_2]_s—Y(R)_{m-1};$$

wherein X is a C_1 to C_{10} linear or branched or cyclic, saturated or unsaturated or epoxidized, aliphatic or aromatic monovalent hydrocarbyl radical;

wherein m is the equivalence of the Y nucleus and is in the range of 4 to 12;

wherein n, p, q and r are independently selected in the range of 0 to 1;

wherein the average s is in the range of 0 to 2;

wherein the average numbers of A groups and C groups per Y nucleus are independently in the range of 0 to 3, the average number of B groups is in the range to provide from 0.3 to 10 hydroxy substituents per molecule, the average number of D groups is in the range of 2 to 10 per molecule and wherein the average number of Y nuclei per molecule is in the range of about 1 to about 4.

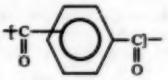
4,931,538

COPOLYESTER AND POLYESTER RESIN COMPOSITION COMPRISING SAID COPOLYESTER

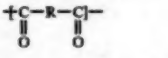
Murata Yoshifumi, Kitakanbara; Kaneda Teruhisa, Osaka; Hara Kazuo; Takamoto Katsunori, both of Kurashiki; Ohonishi Isao, Okayama, and Yokota Shinichi, Kurashiki, all of Japan, assignors to Kuraray Co., Ltd., Kurashiki, Japan

Division of Ser. No. 53,156, May 21, 1987, Pat. No. 4,772,652. This application Jul. 6, 1988, Ser. No. 215,737
Int. Cl.[5] C08G 63/02
U.S. Cl. 528—292 **8 Claims**

1.A moldable copolyester consisting essentially of structural units of the following formulas (I) to (IV):



(I)



(II)

$$—[O—CH_2—CH_2—O]—$$ (III)

$$—O—(CH_2CH_2CH_2CH_2—O)_n—$$ (IV)

wherein R is a divalent group available on elimination of carboxyl groups from an aliphatic dicarboxylic acid containing 18–54 carbon atoms, and n is an integer equal to 8 through 84, wherein (I) is bound to (III) and/or (IV), (II) is bound to (III) and/or (IV), and the sum of moles of (I) and (II) is substantially equal to the sum of moles of (III) and (IV), and unit (II) is contained in a proportion of from 0.2 to 10 moles per 100 moles of unit (I) and the repeating unit $—CH_2CH_2CH_2CH_2O)—$of (IV) is contained in a proportion of from 1 to 20 moles per 100 moles of unit (I).

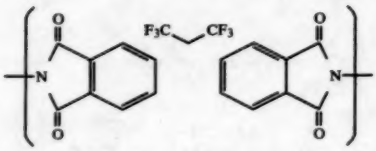
4,931,539

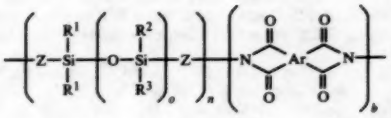
HIGHLY-SOLUBLE, AMORPHOUS SILOXANE POLYIMIDES

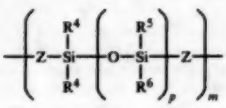
Richard A. Hayes, Parkersburg, W. Va., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 6, 1989, Ser. No. 319,313
Int. Cl.[5] C08G 69/26
U.S. Cl. 528—353 **5 Claims**

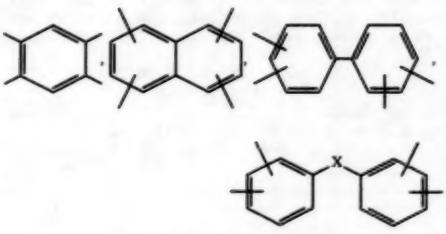
1. A fully-cyclized polyimide silane consisting essentially of the following:





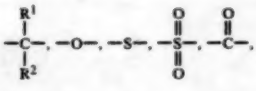


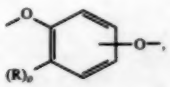
where is an aromatic radical, of the formula



or mixtures thereof, —X— is

or mixtures thereof, —X— is





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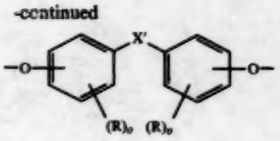
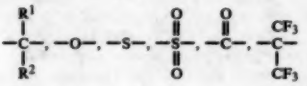


linear alkylene groups of the formula —(CH_2)—1-3 or mixtures thereof, where —X'— is



or mixtures thereof, —z— is a divalent substituted or unsubstituted alkylene or arylene radical, —R, —R^1, —R^2, R^3, —R^4, —R^5, and —R^6 are independently monovalent substituted or unsubstituted hydrocarbon radicals such that

a=5−100% of a+b
b=0−95% of a+b
n+m=100%
o=1−4

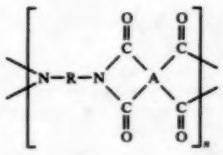
4,931,540

POLYMERS PREPARED FROM 4,4'-BIS[2-(3,4-(DICARBOXYPHENYL)HEXAFLUOROISOPROPYL] DIPHENYL ETHER DIANHYDRIDE

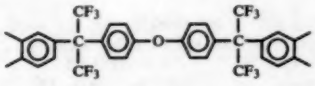
Werner H. Mueller, E. Greenwich; Dinesh N. Khanna; Rohitkumar H. Vora, both of W. Warwick, all of R.I., and Ruediger J. Erckel, Warren, N.J., assignors to Hoechst Celanese Corporation, Somerville, N.J.

Filed Nov. 24, 1987, Ser. No. 124,720
Int. Cl.[5] C08G 69/26, 8/02, 14/00
U.S. Cl. 528—353 **40 Claims**

1. A polyamide polymer having groups of the structure:



wherein n is the number of repeating groups,
A is



and R is a divalent organic radical.

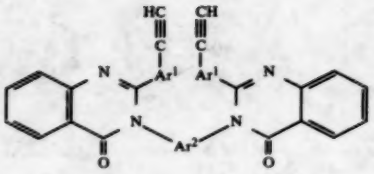
4,931,541

THERMOSETTING QUINAZOLONE RESINS THEIR PREPARATION AND THEIR APPLICATIONS

Régis Mercier, and Bernard Sillion, both of Lyon, France, assignors to Centre d'Etude des Materiaux Organiques pour Technologies Avancees, Solaize-Vernaison, France

Filed Feb. 22, 1989, Ser. No. 313,679
Claims priority, application France, Feb. 23, 1988, 88 02279
Int. Cl.[5] C08G 65/40, 63/62, 67/02, 73/06
U.S. Cl. 528—370 **17 Claims**

1. Thermosetting quinazolone compound of the formula:



in which Ar^1 is a bivalent mono- or polycyclic aromatic radical of 6 to 20 carbon atoms, nonsubstituted or substituted by at least one alkyl group of 1 to 3 carbon atoms, Ar^2 is a bivalent carbocyclic or heterocyclic aromatic radical of 12 to 30 carbon atoms comprising at least two simple aromatic rings bound two by two by bivalent atoms or groups.

4,931,542

PROCESS FOR PREPARING A POLYARYLENE THIOETHER

Eishun Tsuchida, Seki; Hiroyuki Nishide, Tokyo; Kimihisa Yamamoto, Hon, and Sha YHoshida, Narashino, all of Japan, assignors to Idemitsu Petrochemical Company, Limited, Tokyo, Japan

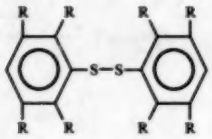
Filed Feb. 26, 1988, Ser. No. 160,936

Claims priority, application Japan, Feb. 28, 1987, 62-46075; Feb. 28, 1987, 62-46076; Mar. 28, 1987, 62-75254

Int. Cl.[5] C08G *75/02, 75/04*

U.S. Cl. 528—373 **4 Claims**

1. A process for preparing a substantially straight chain polyarylene thioether, which comprises polymerizing monomers consisting essentially of a diphenyldisulfide having the formula



[II]

wherein S is sulfur atom and each of four groups R is a substituent selected from the group consisting of hydrogen atom, a lower alkyl group, halogen atom and lower alkoxy group, the groups R may be different from or identical with each other, in the presence of a Lewis acid catalyst at a temperature of between −20° C.-50° C.

4,931,543

PROCESS FOR RECOVERING MICROBIALLY PRODUCED INTERLEUKIN-2

Robert Halenbeck, San Rafael; Flint Smith, and Michael Kunitani, both of Oakland, all of Calif., assignors to Cetus Corporation, Emeryville, Calif.

Continuation-in-part of Ser. No. 48,405, May 11, 1987, abandoned. This application Mar. 25, 1988, Ser. No. 167,145

Int. Cl.[5] C07K *3/28*

U.S. Cl. 530—351 **17 Claims**

1. In a process for recovering recombinant interleukin-2 (rIL-2) from transformed microorganisms containing the rIL-2 wherein the rIL-2 is separated from the bulk of the cellular components of the microorganisms, solubilized in a reduced form, thereafter oxidized, and thereafter purified to clinically acceptable purity and endotoxin levels, the improvement comprising denaturing the oxidized, purified rIL-2 by placing the rIL-2 in a solution of a chaotropic agent, removing solids from the solution, and thereafter renaturing the rIL-2 from the solution, whereby a renatured, oxidized, purified rIL-2 having

improved stability and solubility properties in the absence of detergents is obtained.

4,931,544

SUCCINYLATED INTERLEUKIN-2 FOR PHARMACEUTICAL COMPOSITIONS

Nandini Katre, El Cerrito, and Michael J. Knauf, San Bruno, both of Calif., assignors to Cetus Corporation, Emeryville, Calif.

Continuation of Ser. No. 903,668, Sep. 4, 1986, abandoned. This application Jan. 27, 1988, Ser. No. 148,106

Int. Cl.[5] C07K *13/00, 17/00;* **A61K** *9/52*

U.S. Cl. 530—351 **20 Claims**

1. A biologically active, conjugated, recombinant interleukin2 that is covalently and selectively conjugated to one or more succinyl moieties, wherein said interleukin-2 in its unconjugated form is hydrophobic and insoluble or not readily soluble in water or an aqueous carrier medium under ambient conditions of room temperature and atmospheric pressure at a pH of between about 6 and 8 in the absence of a solubilizing agent.

4,931,545

FLAME RETARDANT POLYCYANATE ESTER BLEND

David A. Shimp, Prospect, and Steven J. Ising, Louisville, both of Ky., assignors to Hi-Tek Polymers, Inc., Jeffersontown, Ky.

Filed May 3, 1989, Ser. No. 347,251

Int. Cl.[5] C08G *83/00*

U.S. Cl. 528—422 **17 Claims**

1. A curable composition comprising a blend of

(A) a dicyanate ester of 4,4'-(hexafluoroisopropylidene) bisphenol and

(B) a polycyanate ester different from A wherein A is present in the amount of about 20 to about 80 weight percent based on the weight of A and B.

4,931,546

PROCESS FOR THE TREATMENT OF COLLAGEN, NOTABLY FOR FACILITATING ITS CROSS-LINKING, AND THE COLLAGEN OBTAINED BY THE APPLICATION OF THE SAID PROCESS

Michel Tardy, Lyons, and Jean-Louis Tayot, La Tour de Salvagny, both of France, assignors to Imedex and Institut Merieux, both of Lyons, France

Filed Jul. 13, 1987, Ser. No. 72,368

Claims priority, application France, Jul. 11, 1986, 86 10160

Int. Cl.[5] C08H *1/06*

U.S. Cl. 530—356 **26 Claims**

1. A process for reticulating collagen and permitting the obtaining of a reticulated collagen with improved stability and mechanical characteristics, comprising submitting a non-reticulated collagen to a controlled oxidation by treatment with a solution of periodic acid or of a periodate.

4,931,547

MONOCLONAL ANTIBODIES TO LEGIONELLA

Paul S. Hoffman, Memphis, Tenn.; Leta O. Heisel, Atlanta, Ga.; William F. Bibb, Decatur, Ga., and Roger M. McKinney, Dunwoody, Ga., assignors to The University of Tennesse Research Corporation, Knoxville, Tenn.

Continuation of Ser. No. 838,685, Mar. 12, 1986. This application May 31, 1988, Ser. No. 205,625

Int. Cl.[5] C07K *15/28*; C12N *5/20*

U.S. Cl. 530—387 7 Claims

1. A monoclonal antibody that specifically binds a genus-specific epitope present on outer membrane proteins of bacteria of the genus Legionella.

4,931,548

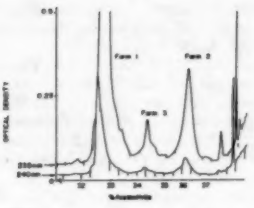
HETERODIMER FORM OF TRANSFORMING GROWTH FACTOR-BETA

Roger C. Lucas, Blaine; James A. Weatherbee, St. Anthony, and Monica L.-S. Tsang, St. Anthony, all of Minn., assignors to Techne Corporation, Minneapolis, Minn.

Filed Jan. 30, 1987, Ser. No. 8,808

Int. Cl.[5] C07K *13/00*; A61K *37/24*

U.S. Cl. 530—399 2 Claims



1. A substantially pure polypeptide growth factor characterized in that the factor is found in mammalian platelets, has activity in the TGF-β assay, and is a heterodimeer having an apparent molecular weight of 25,000 daltons as determined by SDS-PAGE, one of the chains of the dimer having the N-terminal amino acid sequence:

5 10
Ala—Leu—Asp—Ala—Ala—Tyr—Cys—Phe—Arg—Asn—

15 20
—Val—Glu—Asp—Asn—Cys—Cys—Leu—Arg—Pro—Leu—

25 30
—Tyr—Ile—Asp—Phe—Lys—Arg—Asp—Leu—Gly—Trp—

35 40
—Lys—Trp—Ile—His—Glu—Cys—Cys—Gly—Tyr—Asn—

45 50
—Ala—Asn—Phe—Cys—Ala—Gly—Gly—Cys—Pro—Tyr—

and the other chain of the dimer having the N-terminal amino acid sequence:

5 10
Ala—Leu—Asp—Thr—Asn—Tyr—Cys—Phe—Ser—Ser—

-continued

15 20
—Thr—Glu—Lys—Asn—Cys—Cys—Val—Arg—Gln—Leu—

25 30
—Tyr—Ile—Asp—Phe—Arg—Lys—Asp—Leu—Gly—Trp—

35 40
—Lys—Trp—Ile—His—Glu—Pro—Lys—Gly—Tyr—His—

45 50
—Ala—Asn—Phe—Cys—Leu—Gly—Pro—Cys—Pro—Tyr—.

4,931,549

PROCESS FOR ARYL-QUINONE AND ARYL-NAPHTHOQUINONE DIAZIDE SULFONIC ACIDS

Paul Berner, East Greenwich, R.I., assignor to Hoechst Celanese Corporation, Somerville, N.J.

Filed Mar. 24, 1987, Ser. No. 29,843

Int. Cl.[5] C07C *113/00*

U.S. Cl. 534—557 15 Claims

1. A process for the preparation of an aryl-diazidesulfonic acids represented by the formula:

$$R_x—A—(SO_3M)_y$$

where A represents a aryl group of the quinone diazide or a naphthoquinonediazide structure containing an oxo (O=) anion and a diazonium (N_2=) cation, R represents a monovalent substituent selected from halogen, nitro, and lower alkyl of 1–6 carbons, x represents an integer from 0 to 3, y represents an integer from 1 to 3 and M represents a hydrogen atom, said diazide sulfonic acid being prepared from a hydroxy-substituted aryl sulfonic acid represented by the formula:

$$R_x—Ar(OH)—(SO_3M)_y$$

wherein R, M, x and y are as defined above, Ar is an benzene or naphthalene nucleus, which comprises:

(a) nitrosating the ring of said benzene or naphthalene nucleus in a solvent at a pH from about 1 to 3, at a temperature from about 0° to 40° C. to introduce a nitroso substituent into said ring;

(b) converting said nitroso substitutent of said nitroso-substituted aryl sulfonic acid to a sulfamate substituent by contacting said nitroso-substituted aryl sulfonic acid with a metal sulfite at a pH value of about 8.5 to 9.5, and raising the reaction temperature to about 45° to 60= C.;

(c) mixing the reaction product of step (b) with a diazoting agent under weakly acidic pH and nonreactive temperature conditions to form a uniform mixture of said reaction product and said diazotizing agent and;

(d) acidifying said uniform mixture to diazotize said sulfamate substituent to form said aryl-diazide-sulfonic acid.

4,931,550

LITHIUM SALT OF COPPER COMPLEX MONOAZO DYE

Arthur Quayle, Bury, and Cecil V. Stead, Manchester, both of England, assignors to Imperial Chemical Industries PLC, London, England

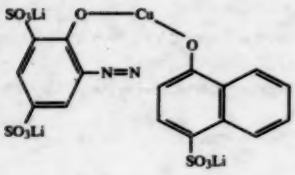
Filed May 5, 1987, Ser. No. 46,200

Claims priority, application United Kingdom, May 13, 1986, 8611637; Jul. 16, 1986, 8617372

Int. Cl.[5] C09B *45/08*, *45/18*; C09D *11/02*, *11/16*

U.S. Cl. 534—724 1 Claim

1. The dye of the formula:



4,931,551

DISPERSIONS OF CHITIN AND PRODUCT THEREFROM

Charles J. Albisetti, Rehoboth, and John E. Castle, Lewes, both of Del., assignors to University of Delaware, Newark, Del.

Filed Jul. 5, 1988, Ser. No. 214,977

Int. Cl.[5] C08B *37/00*; C07H *5/00*; A61K *31/00*; D21D *1/00*

U.S. Cl. 536—20 12 Claims

9. The paper resulting from coalescing and drying an aqueous dispersion of chitin formed by shearing in water chitin which has been treated with an aqueous oxidizing bleach.

4,931,552

PRODUCTION OF POLYOL POLYESTERS HAVING REDUCED COLOR CONTENT

Michael S. Gibson, Sacramento, Calif.; Larry N. Hawkins, Cincinnati, Ohio; Marjorie M. Peffly, Cincinnati, Ohio; Corey J. Kenneally, Maineville, Ohio, and Patrick J. Corrigan, Cincinnati, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Continuation-in-part of Ser. No. 213,661, Jun. 30, 1988, abandoned. This application Jun. 14, 1989, Ser. No. 364,619

Int. Cl.[5] C07H *13/02*, *1/00*; C11C *3/00*; C09F *3/00*

U.S. Cl. 536—119 24 Claims

1. A process for preparing polyol polyesters of improved color from polyols and C_1–C_3 alkyl esters of C_6–C_{22} fatty acids comprising reacting C_1–C_3 alkyl fatty esters having a carbonyl content of less than about 200 ppm with a polyol in the presence of a catalyst for the reaction and concurrently removing from the reaction mix the C_1–C_3 alcohol formed during the reaction.

4,931,553

PLATINUM-POLYMER COMPLEXES AND THEIR USE AS ANTITUMOR AGENTS

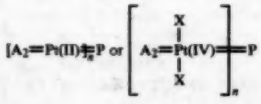
Devinder S. Gill, 11,800 Baltimore Ave., Beltsville, Md. 20705, and Peter J. Andrulis, Jr., 7315 Wisconsin Ave., Bethesda, Md. 20814

Filed May 11, 1988, Ser. No. 192,451

Int. Cl.[5] C07F *15/00*; A61K *31/28*

U.S. Cl. 536—121 26 Claims

1. A polymeric platinum-amine complex of the formula



wherein

each A independently represents a monodentate amine ligand or NH_3 or A_2 represents a single bidentate amine ligand;

n is a positive integer up to 500;

P is a divalent ligand of a physiologically acceptable homopolymer or copolymer bearing at least 2×n pendant anionic groups, pairs of which form covalent linkages with the $Pt(II)A_2$ or $Pt(IV)A_2$ group; and

X is an anionic ligand.

18. In a method of treating a patient with a tumor susceptible to platinum therapy by administering thereto an antitumor-effective amount of a platinum complex the improvement wherein the complex is a platinum complex according to claim 1.

4,931,554

METHOD OF PREPARING A SOLID COMPOSITION OF LACTULOSE, AND COMPOSITION SO OBTAINED

Hugo Bijl, and Sebastiaan J. W. Vroklage, both of Olst, Netherlands, assignors to Duphar International Research B.V., Weesp, Netherlands

Filed Feb. 17, 1989, Ser. No. 311,953

Claims priority, application Netherlands, Feb. 22, 1988, 8800431

Int. Cl.[5] C07H *1/00*; A01N *43/04*

U.S. Cl. 536—124 8 Claims

1. A process of preparing a solid composition of lactulose comprising the steps of mixing a lactulose syrup with spreading the mixture, drying mixture, and crushing the mixture. product having a fiber content of more than 80% by weight.

4,931,555

DISULFIDE SUBSTITUTED OXAZETIDINE DERIVATIVES

Takashi Kamiya, Suita; Yoshihisa Saito, Takarazuka; Tsutomu Teraji, Hirakata; Osamu Nakaguit, Osaka; Teruo Oku, Kyoto; Hitoshi Nakamura, and Masashi Hashimoto, both of Toyonaka, all of Japan, assignors to Fujisawa Pharmaceutical Company, Ltd., Osaka, Japan

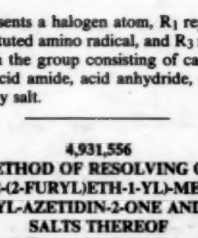
Division of Ser. No. 211,911, Dec. 1, 1980, Pat. No. 4,435,341, which is a division of Ser. No. 852,053, Nov. 16, 1977, Pat. No. 4,267,340, which is a division of Ser. No. 711,980, Aug. 5, 1976, Pat. No. 4,071,527, which is a division of Ser. No. 430,688, Jan. 4, 1974, Pat. No. 3,993,646, which is a continuation-in-part of Ser. No. 266,470, Jun. 26, 1972, abandoned. This application Jan. 26, 1981, Ser. No. 228,621

Claims priority, application Japan, Jun. 24, 1971, 46-46158; Aug. 14, 1971, 46-61776; Aug. 14, 1971, 46-61777; Aug. 18, 1971, 46-62687; Aug. 21, 1971, 46-63885; Aug. 21, 1971, 46-63886; Sep. 9, 1971, 46-70018; Dec. 23, 1971, 47-2516

Int. Cl.[5] C07D *501/14*

U.S. Cl. 540—222 22 Claims

1. A cepham derivative having the formula:



wherein X represents a halogen atom, R_1 represents a substituted or unsubstituted amino radical, and R_3 represents a radical selected from the group consisting of carboxy, protected carboxy, ester, acid amide, acid anhydride, acid halide, acid azide and carboxy salt.

4,931,556

METHOD OF RESOLVING CIS 3-AMINO-4-(2-(2-FURYL)ETH-1-YL)-METHOXYCARBONYLMETHYL-AZETIDIN-2-ONE AND MALIC ACID SALTS THEREOF

Brett D. Boyer, and Thomas M. Eckrich, both of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Filed Oct. 17, 1988, Ser. No. 258,919

Int. Cl.[5] C07B *57/00*; C07D *405/06*

U.S. Cl. 540—364 2 Claims

1. The S(−)-malic acid salt of cis ββ-3-amino-4-[2-(2-furyl)eth-1-yl]-1-methoxycarbonylmethyl-azetidin-2-one.

2. The R(+)-malic acid salt of cis $\alpha\alpha$-3-amino-4-[2-(2-furyl)eth-1-yl]-1-methoxycarbonylmethyl-azetidin-2-one.

4,931,557
METHOD OF RESOLVING CIS 3-AMINO-4-(2-FURYL)VINYL)-1-METHOXYCARBONYL-METHYL-AZETIDIN-2-ONE AND DI-P-TOLUOYL-TARTARIC ACID SALTS THEREOF

John Brennan, and Thomas M. Eckrich, both of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Filed Oct. 17, 1988, Ser. No. 258,918
Int. Cl.[5] C07B 57/00; C07D 407/06
U.S. Cl. 540—364 **2 Claims**

1. The di-p-toluoyl-(D)-tartaric acid salt of cis $\beta\beta$-3-amino-4-[2-(furyl)vinyl-1-yl]-methoxycarbonylmethyl-azetidin-2-one.

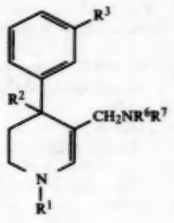
2. The di-p-toluoyl(L)-tartaric acid salt of cis $\alpha\alpha$-3-amino-4-(furyl)vinyl-1-yl]-methoxycarbonylmethyl-azetidin-2-one.

4,931,558
PROCESSES FOR PREPARING INTERMEDIATES OF PICENADOL

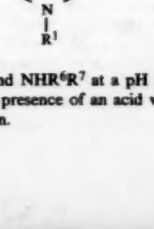
Charles J. Barnett, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Division of Ser. No. 810,457, Dec. 18, 1985, Pat. No. 4,663,460, which is a division of Ser. No. 534,468, Sep. 21, 1983, Pat. No. 4,581,456. This application Jan. 13, 1987, Ser. No. 2,882
Int. Cl.[5] C07D 413/06
U.S. Cl. 544—124 **3 Claims**

1. A process for preparing a 1,4-dialkyl-4-(3-substituted phenyl)-3-tetrahydropyridinemethanamine of the formula



wherein R^1 and R^2 are independently C_1–C_4 alkyl, R^3 is C_1–C_3 alkoxy, and R^6 and R^7 are independently C_1–C_3 alkyl or, when taken together with the nitrogen atom to which they are attached, form piperidine, piperazine, N-methylpiperazine, morpholine or pyrrolidine, comprising reacting a 1,4-dialkyl-4-(3-substituted phenyl)tetrahydropyridine of the formula



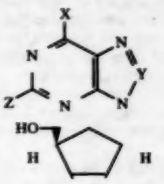
with formaldehyde and NHR^6R^7 at a pH from about 1.0 to about 5.0, and in the presence of an acid which provides an non-nucleophilic anion.

4,931,559
OPTICALLY-ACTIVE ISOMERS OF DIDEOXYCARBOCYCLIC NUCLEOSIDES

Robert Vince, St. Paul, Minn., and Mei Hua, Beijing, China, assignors to Regents of the University of Minnesota, Minneapolis, Minn.

Continuation-in-part of Ser. No. 146,252, Jan. 20, 1988. This application Dec. 5, 1988, Ser. No. 278,652
The portion of the term of this patent subsequent to Apr. 10, 2007, has been disclaimed.
Int. Cl.[5] A61K 31/52; C07D 473/30, 473, 18, 473/32
U.S. Cl. 544—276 **7 Claims**

1. An optically-active enantiomer of the formula:



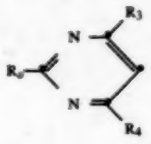
wherein Y is CH, X is Cl, NH_2, SH or OH, and Z is H or NH_2, and the pharmaceutically-acceptable salts thereof.

4,931,560
PESTICIDES

Adolf Hubele, Magden, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Sep. 21, 1988, Ser. No. 247,203
Claims priority, application Switzerland, Sep. 28, 1987, 3750/87-2; Apr. 11, 1988, 1333/88-5
Int. Cl.[5] C07D 239/02
U.S. Cl. 544—315 **1 Claim**

1. A compound of the formula



in which:

R_6 is halogen or R_5—SO_2—; R_3 is hydrogen; C_1–C_4alkyl; or C_1–C_4alkyl substituted by halogen, hydroxy or by cyano; cyclopropyl; or cyclopropyl mono- to tri-substituted by methyl and/or by halogen; R_4 is

C_3–C_6cycloalkyl or

C_3–C_6cycloalkyl mono- to tri-substituted by methyl and/or by halogen; and

R_5 is C_1–C_8alkyl or benzyl that is unsubstituted or substituted by halogen and/or by C_1–C_4alkyl.

4,931,561
PROCESS FOR PREPARING NITRILES

Shinkichi Shimizu, Hirakata; Takayuki Shoji, Osaka; Kanji Kono, Osaka, and Toru Nakaishi, Osaka, all of Japan, assignors to Koei Chemical Co., Ltd., Osaka, Japan

Filed Jul. 25, 1988, Ser. No. 224,012
Claims priority, application Japan, Jul. 29, 1987, 62-189168; Jul. 29, 1987, 62-189169; Jul. 29, 1987, 62-189170
Int. Cl.[5] C07D 241/14, 213/84, 213/85
U.S. Cl. 544—336 **5 Claims**

1. A process for preparing a heteroaromatic nitrile comprising catalytically reacting an alkyl-substituted heteroaromatic compound selected from the group consisting of alkyl-sub-

stituted pyridines and alkyl-substituted pyrazines wherein the alkyl substituent is methyl or ethyl, with molecular oxygen and ammonia in the gaseous phase at a temperature of 300 to 650° C., in the presence of a catalyst having the following composition:

$$Mo(P)_x(A)_y(B)_z(O)_w \quad (I)$$

wherein x, y, z and w represent atomic ratios of phosphorus, an element A defined below, an element B defined below and oxygen to molybdenum, respectively and

(i) x and z are both zero, y is from 0.1 to 5, and A is at least one element selected from the group consisting of cerium and tungsten, or

(ii) x is from 0.1 to 7, y is from 0 to 5, z is from 0 to 5, A is at least one element selected from the group consisting of cerium, manganese and tungsten, and B is at least one element selected from the group consisting of thallium, titanium, niobium and aluminum, or

(iii) x is from 0.5 to 7, y is a positive number up to 5, z is from 0.01 to 2, A is at least one element selected from the group consisting of cerium, managanese and tungsten, and B is vanadium,

and w is defined from the valencies of molybdenum, phosphorus, the element A, the element B and the values x, y and z.

4,931,562
PIPERIDINES

Yasuhiro Akabane, Chiba; Takamitsu Tamura, Tanashi, and Masami Fujiwara, Tokyo, all of Japan, assignors to Lion Corporation, Tokyo, Japan and Sankyo Company Limited, Tokyo, Japan

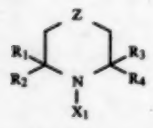
Division of Ser. No. 92,884, Sep. 4, 1987, Pat. No. 4,820,437. This application Jan. 11, 1989, Ser. No. 295,670

Claims priority, application Japan, Sep. 18, 1986, 61-220214; Dec. 26, 1986, 61-315200; May 28, 1987, 62-132698

Int. Cl.[5] C07D 471/10, 211/46, 211/58

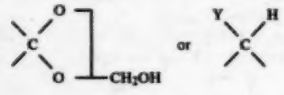
U.S. Cl. 546—19 2 Claims

1. A 1-halopiperidine derivative having the following Formula (I):

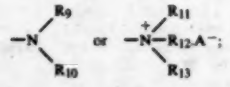


(I)

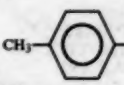
wherein R_1, R_2, R_3 and R_4 each denotes an alkyl group having 1 to 12 carbon atoms and may be the same as or different from each other, X_1 denotes a halogen atom; and Z denotes a group having the following formula:



wherein Y denotes an alkoxyl group having 1 to 4 carbon atoms,



R_9 and R_{10} may be the same or different and each denotes C_mH_{2m+1}, $C_mH_{2m}OH$, $C_mH_{2m-1}(OH)_2$, $C_mH_{2m}COOM_1$ wherein M_1 denotes H or an alkali metal, or an alkanoyl group having 2 to 8 carbon atoms; R_{11} and R_{12} may be the same or different and each denote C_mH_{2m+1}, $C_mH_{2m}OH$ or C_mH_{2m}-phenyl; R_{13} denotes a hydrogen atom or C_mH_{2m+1}; m is an integer from 1 to 4; and A^- denotes an anion selected from the group consisting of Cl^-, CH_3COO^-, and



4,931,563
OLEUM SULFONATION OF PHENYL QUATERNARY ALKYL AMMONIUM AND PHOSPHONIUM CARBONATE ESTERS

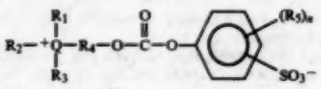
Stephen A. Madison, and Leonora M. Ilardi, both of Valley Cottage, N.Y., assignors to Lever Brothers Company, New York, N.Y.

Filed Nov. 16, 1988, Ser. No. 272,143

Int. Cl.[5] C07D 211/42, 211/46; C07C 143/26

U.S. Cl. 546—222 14 Claims

1. A process for preparation of sulfophenyl quaternary ammonium and phosphonium carbonate esters of the formula:



(I)

wherein:

R_1, R_2 and R_3 are each a radical selected from the group consisting of alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl, alkaryl, aryl, phenyl, hydroxyalkyl, and polyoxyalkylene;

or two or more of R_1, R_2, and R_3 together form an alkyl substituted or unsubstituted nitrogen-containing heterocyclic ring system;

or at least one of R_1, R_2, and R_3 is attached to R_4 to form an alkyl substituted or unsubstituted nitrogen-containing heterocyclic ring system;

R_4 is selected from a bridging group consisting of alkylene, cycloalkylene, alkylenephenylene, phenylene, arylene, and polyalkoxylene; and wherein the bridging group can be unsubstituted or substituted with C_1–C_{20} atoms selected from alkyl, alkenyl, benzyl, phenyl and aryl radicals;

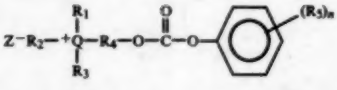
Q is nitrogen or phosphorous;

R_5 is C_1–C_{12} alkyl, C_1–C_{12} alkoxy, carboxy, hydroxy, C_1–C_{12} alkyl carboxy group and mixtures thereof; and

n ranges from 0 to 4;

comprising the steps of:

(i) reacting a phenyl quaternary ammonium or phosphonium carbonate of the formula:



(II)

wherein Z^- is a monovalent or multivalent anion leading to charge neutrality when combined in the appropriate ratio with Q^+; with a sulfonation reagent consisting of oleum wherein the percent sulfur trioxide ranges from about 0.5 up to 33%; and

(ii) recovering from the reaction said quaternary ammonium or phosphonium carbonate ester of formula I.

14. A process according to claim 1 wherein the ester product is 4-(1,1-dimethylpiperidinium) 4-sulfophenyl carbonate salt.

4,931,564

PREPARATION OF CYANOPYRIDINES

Wolfgang Hoelderich, Frankenthal, and Norbert Goetz, Worms, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Dec. 2, 1988, Ser. No. 279,041

Claims priority, application Fed. Rep. of Germany, Dec. 4, 1987, 3741159

Int. Cl.[5] C07D *213/57*

U.S. Cl. 546—286 8 Claims

1. A process for the preparation of 2-methyl-3-cyano-pyridine which comprises: reacting acrolein and methyl acetoacetate with ammonia in the presence of a zeolite as a catalyst.

4,931,565

PROCESS FOR PRODUCTION OF 2-PYRAZOLIN-5-ONES

Masatoshi Baba; Norio Tanaka, and Hideo Suzuki, all of Funabashi, Japan, assignors to Nissan Chemical Industries, Ltd., Tokyo, Japan

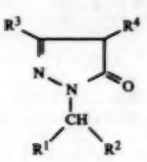
Continuation of Ser. No. 32,625, Apr. 1, 1987, abandoned. This application Apr. 20, 1989, Ser. No. 342,703

Claims priority, application Japan, Apr. 2, 1986, 61-76287

Int. Cl.[5] C07D *231/20*

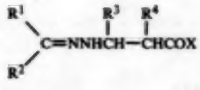
U.S. Cl. 548—363 4 Claims

1. A process for production of a 2-pyrazolin-5-one having the formula (I):



(I)

which comprises cyclizing a hydrazone derivative having the formula (II):



(II)

in the presence of a base;

wherein R^1 and R^2 each represents a hydrogen atom, an alkyl group which may be substituted with a halogen atom or a lower alkoxy group, an alkenyl group, a phenyl group which may be substituted, a naphthyl group which may be substituted, an aralkyl group which may be substituted or a hetetrocyclic group which may be substituted; R^1 and R^2 together with the carbon atom to which they attach may form a ring; provided that said substituents for the phenyl group, naphthyl group, aralkyl group and heterocyclic group described above include a halogen atom, a lower alkyl group which may be substituted with a halogen atom, a lower alkenyl group, a lower alkoxy group, a cyano group, a nitro group, a lower alkoxycarbonyl group, a carboxyl group or $—NR^5R^6$; R^3 represents a hydrogen atom, a lower alkyl group or a lower alkoxycarbonyl group; R^4 represents a hydrogen atom or a lower alkyl group; X represents a lower alkoxy group or $—NR^5R^6$; R^5 and R^6 described above each represents a hydrogen atom, a lower alkyl group or a lower alkenyl group and, R^5 and R^6 together with the nitrogen to which they attach may form a ring.

4,931,566

PROCESS FOR THE PREPARATION OF PYRROLO[3,4-C]PYRROLES

Werner Surber, Oberwil; Abul Iqbal, Arconciel, and Christian Stern, Kaiseraugst, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

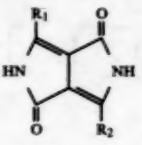
Filed Jul. 14, 1988, Ser. No. 218,770

Claims priority, application Switzerland, Jul. 31, 1987, 2935/87

Int. Cl.[5] C07D *471/02*

U.S. Cl. 548—453 15 Claims

1. In the process for the preparation of a 1,4-diketopyrrolo[3,4]-pyrrole of the formula I



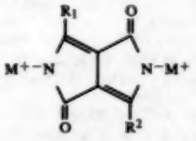
(I)

in which R_1 and R_2 independently of one another are phenyl, biphenyl or naphthyl radicals or aromatic heterocycles selected from the group consisting of quinolyl, isoquinolyl, o-, m-, p-pyridyl, furanyl, thiofuranyl, benzoxazolyl, benzthiazolyl, and benzimidazolyl radicals, by reacting 1 mole of a dicyclohexyl succinate, dialkyl succinate, monoalkylmonophenyl or diphenyl succinate, alkyl in the succinic acid ester radical being C_1–C_{18}alkyl and phenyl being phenyl which is unsubstituted or substituted by one or two halogen atoms or one or two C_1–C_6alkoxy groups, with 2 moles of a nitrile of the formula II or III or with 1 mole of a nitrile of the formula II and 1 mole of a nitrile of the formula III

$$R_1—CN, \quad \text{(II)}$$

$$R_2—CN \quad \text{(III)}$$

in which R_1 and R_2 are as defined above, in an inert organic solvent, in the presence of an alkali metal or an alkali metal alcoholate, as a strong base, and at elevated temperature to give an alkali metal salt of the formula IV



(IV)

in which M is an alkali metal, and subsequently liberating a compound of the formula I by protolysis of a compound of the above IV, the improvement consisting of

(a) dividing the compound of formula IV into at least two portions, adding each portion sequentially into a protolysis medium of water, an inorganic acid, an organic acid, a mixture of an inorganic and an organic acid, a mixture of water and an organic solvent, a mixture of an organic acid and water or a mixture of an inorganic acid or an organic acid with water and/or at least one organic solvent, or

(b) dividing a protolysis medium of water, an inorganic acid, an organic acid, a mixture of an inorganic and an organic acid, a mixture of water and an organic solvent, a mixture of an organic acid and water or a mixture of an inorganic acid or an organic acid with water and/or at least one organic solvent into at least two portions, adding each portion sequentially to the compound of formula IV, and reacting the resulting mixture in each instance at a temperature from 20° to 150° C. after each addition.

4,931,567
BIS(INDOLYL)ETHYLENE COMPOUNDS

Hubertus Psaar, and Horst Berneth, both of Leverkusen, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

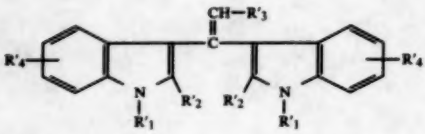
Division of Ser. No. 261,945, Oct. 24, 1988. This application Sep. 19, 1989, Ser. No. 409,186

Claims priority, application Fed. Rep. of Germany, Nov. 11, 1987, 3738237

Int. Cl.[5] C07D *403/06*

U.S. Cl. 548—455 **3 Claims**

1. Bis(indolyl)ethylenes of the formula



wherein either

(a) R'_1 denotes C_2–C_{12}-alkyl or benzyl, R'_2 and R'_3 denote hydrogen, alkyl or benzyl, R'_4 denotes hydrogen, alkyl, alkoxy or halogen, and phenyl and benzyl, each of which can be substituted by alkyl, alkoxy or halogen, or

(b) R'_1 denotes hydrogen, alkyl, or benzyl which can be substituted by alkyl, alkoxy or halogen, and R'_4 denotes alkyl, alkoxy or halogen, and R'_2 and R'_3 have the above-mentioned meaning, or

(c) R'_1 denotes hydrogen, alkyl, or benzyl which can be substituted by alkyl, alkoxy or halogen, R'_2 denotes phenyl which can be substituted by alkyl, alkoxy or halogen, R'_3 denotes hydrogen, alkyl, or phenyl which can be substituted by alkyl, alkoxy or halogen, and R'_4 denotes hydrogen, alkyl, alkoxy or halogen, or

(d) R'_1 denotes hydrogen, alkyl, or benzyl which can be substituted by alkyl, alkoxy or halogen, R'_2 denotes phenyl, R'_3 denotes alkyl or phenyl and R'_4 denotes hydrogen, alkyl, alkoxy or halogen, and wherein alkyl—when not named separately—stands for C_1–C_{12}-alkyl and alkoxy stands for C_1–C_{12}-alkoxy and the alkyl radicals can be substituted by chlorine, cyano or carboxyl.

4,931,568
PROCESS FOR THE PREPARATION OF THIOPHENE ETHERS

Peter Wegener, Königstein; Michael Feldhues, Bad Soden am Taunus, and Heinz Litterer, Bad Schwalbach, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

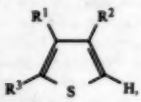
Filed Feb. 9, 1989, Ser. No. 308,893

Claims priority, application Fed. Rep. of Germany, Feb. 13, 1988, 3804522

Int. Cl.[5] C07D *409/00, 333/32*

U.S. Cl. 549—6 **8 Claims**

1. A thiophene ether of the formula I



(I)

in which

R^1 denotes a straight-chain or branched C_7–C_{18}-alkoxy radical, a C_4–C_{18}alkenyloxy radical, a C_3–C_{12}-alkynyloxy radical, a C_5–C_6-cycloalkoxy radical, a phenyl-C_1–C_4-alkoxy radical, a radical of the formula II

$$—O(CH_2)_n—X \quad (II)$$

in which n is 2 to 6 and X denotes a halogen atom, a hydroxyl, carboxylic ester, —SO_3Me (Me is an alkali metal or —$N^+R_4^5$ where R^5 is H or alkyl), nitro, cyano, carboxamide, —OCH_3, —OC_2H_5 or —$(OCH_2CH_2)_m$—OCH_3 group where m is 1 to 3, a quaternary ammonium group or a —$P(O)(OR^4)_2$ group where R^4 is H or C_1–C_4-alkyl, or denotes a radical of glycolic acid, thioglycolic acid, lactic acid or the ester of these acids,

R^2 denotes R^1 or a hydrogen atom, a C_1–C_{12}-alkyl group or an aryl radical,

R^3 denotes a hydrogen atom, a C_1–C_6-alkyl group or a C_4–C_6-alkoxy group.

4,931,569
PURIFICATION OF STABLE WATER-SOLUBLE DIOXETANES

Brooks Edwards, and John C. Voyta, both of Cambridge, Mass., assignors to Tropix, Inc., Bedford, Mass.

Filed Sep. 14, 1988, Ser. No. 244,006

Int. Cl.[5] C07D *321/00*; C07F *9/12*

U.S. Cl. 549—221 **31 Claims**

1. A purified chemiluminescent water-soluble derivative of 1,2-dioxetane prepared by a method comprising subjecting the corresponding impure 1,2-dioxetane derivative, as an alkali metal or quaternary ammonium salt, at an alkaline pH, to liquid chromatography on an alkali-stable stationary phase having the chromatographic characteristics of a reversed phase absorbent, using a mobile phase comprising at least one water-miscible organic solvent for the 1,2-dioxetane derivative, the method being carried out at a concentration of organic or inorganic moieties containing unshared pairs of electrons as low as can practically be achieved.

4,931,570
PROCESS FOR THE PRODUCTION OF 4-ALKOXY-2(5H) THIOPHENONES

Thomas Meul, Visp, Switzerland, assignor to Lonza Ltd., Gampel/Valais, Switzerland

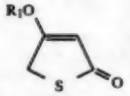
Division of Ser. No. 97,109, Sep. 16, 1987. This application Oct. 14, 1988, Ser. No. 258,072

Claims priority, application Switzerland, Sep. 24, 1986, 3827/86

Int. Cl.[5] C07D *333/32*

U.S. Cl. 549—62 **3 Claims**

1. Process for the production of thiotetronic acid, comprising reacting a 4-alkoxy-2(5H) thiophenone of the formula:



(I)

wherein R_1 is a straight-chain or branched alkyl having 1 to 4 carbon atoms, with gaseous hydrochloric acid in anhydrous acetic acid at a temperature of 20° to 60° C.

4,931,571
PROCESS FOR PREPARING ALKYLENE CARBONATES FROM ALKYLENE OXIDES

Robert M. Weinstein, Geneva, Switzerland, assignor to Scientific Design Company, Inc., Little Ferry, N.J.

Division of Ser. No. 664,728, Oct. 25, 1984, Pat. No. 4,851,555. This application Apr. 10, 1989, Ser. No. 335,379

Int. Cl.[5] C07D *317/12*

U.S. Cl. 549—230 **3 Claims**

1. A process for the preparation of an alkylene carbonate comprising reacting the corresponding alkylene oxide with carbon dioxide in the presence of an effective amount of a quaternary arsonium halide.

4,931,572

AROMATIC CARBOXYLIC ANHYDRIDE CATALYST

Ramzi Y. Saleh, Neshanic Station, and Israel E. Wachs, Bridgewater, both of N.J., assignors to Exxon Chemical Patents Inc., Linden, N.J.

Filed May 17, 1989, Ser. No. 353,252
Int. Cl.[5] C07D 307/89, 493/04
U.S. Cl. 549—239 23 Claims

1. A process for the preparation of a carboxylic anhydride comprising reacting a hydrocarbon with molecular oxygen in the vapor phase, in the presence of a solid oxidation catalyst, said solid oxidation catalyst being obtained by the steps of:

(a) forming a catalyst precursor by depositing on titanium dioxide in the rutile form, a discontinuous monolayer amount of at least one Group IA metal oxide source which is convertible to the Group IA metal oxide upon calcining;

(b) calcining said catalyst precursor under conditions sufficient to convert at least a portion of said Group IA metal oxide source into the Group IA metal oxide;

(c) depositing upon the calcined catalyst precursor a catalytically effective amount of at least one vanadium oxide source which is convertible to vanadium oxide upon calcining; and

(d) calcining the catalyst solids formed in step (c) under conditions sufficient to convert at least a portion of said vanadium compound to vanadium oxide.

4,931,573

METHOD FOR PRODUCING A LACTONE

Keisuke Wada, Yokohama; Yoshinori Hara, Machida, and Koushi Sasaki, Kawasaki, all of Japan, assignors to Mitsubishi Kasei Corporation, Tokyo, Japan

Filed Apr. 4, 1988, Ser. No. 177,363
Claims priority, application Japan, Apr. 18, 1987, 62-95682
Int. Cl.[5] C07D 307/28
U.S. Cl. 549—325 20 Claims

1. A method for producting a lactone, which comprises hydrogenating in the liquid phase a dicarboxylic acid, a dicarboxylic acid anhydride or a dicarboxylic acid ester or a combination thereof in the presence of a catalyst, said catalyst comprising (1) ruthenium, (2) an organic phosphine selected from the group consisting of tri-n-butylphosphine, dimethyl-n-octylphosphine, tricyclohexylphosphine, triphenylphosphine, dimethylphenylphosphine and 1,2-bis(diphenylphosphino) ethane and (3) a compound of a metal selected from the group consisting of groups IVA, VA and IIIB of the Periodic Table.

7. A method for producing a lactone, which comprises hydrogneating in the liquid phase a dicarboxylic acid dicarboxylic acid anhydride or a dicarboxylic acid ester or a combination thereof in the presence of catalyst, said catalyst comprising (1) ruthenium, (2) an organic phosphine selected from the group consisting of tri-n-butylphosphine, dimethyl-n-octylphosphine, tricyclohexylphosphine, triphenylphosphine, dimethylphenylphosphine and 1,2-bis(diphenylphosphino)ethane (3) a compound of a metal selected from the group consisting of Group IVA, VA and IIIB of the Periodic Table, and (4) a conjugate base of an acid having a pKa of less than 2.

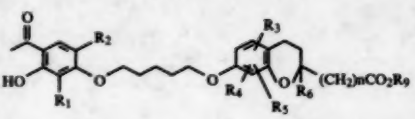
4,931,574

PROCESS FOR THE PREPARATION OF BENZOPYRANS

Percy S. Manchand, Montclair, N.J., and Robert A. Michelli, Kensington, Calif., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Aug. 23, 1988, Ser. No. 235,129
Int. Cl.[5] C07D 311/66, 311/58
U.S. Cl. 549—405 14 Claims

1. A process for preparing a compound of the formula

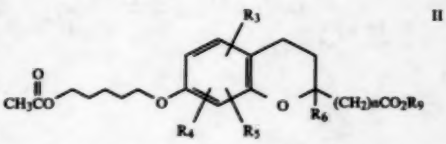


Ia

wherein R_1 is hydrogen or lower alkyl; R_2 is hydrogen or halogen; R_3, R_4 and R_5 are hydrogen, acyl or lower alkyl; R_6 is hydrogen or lower alkyl; R_9 is lower alkyl and n is an integer of 0–4; provided that only one of R_3, R_4 or R_5 can be acyl;

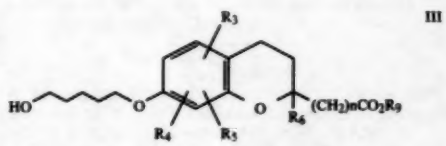
enantiomers thereof, or a salt thereof, which comprises

(a) reacting a compound of the formula



II

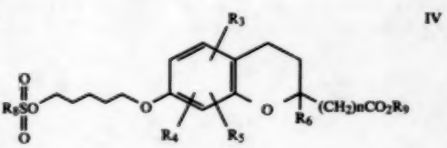
wherein R_3, R_4, R_5, R_6, R_9, and n are as described above with a base in a polar, protic organic solvent to obtain a compound of the formula



III

wherein R_3, R_4, R_6, R_6, R_9 and n are as described above;

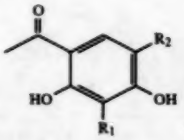
(b) reacting the product of step (a) with a sulfonating agent in a polar organic solvent to obtain a compound of the formula



IV

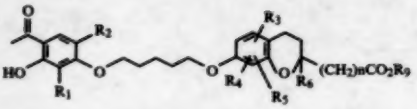
wherein R_3, R_4, R_5, R_6, R_9 and n are as described above, and R_8 is lower alkyl or aryl;

(c) reacting the product of step (b) with a compound of the formula



V

wherein R_1 and R_2 are as described above in a polar, aprotic organic solvent or in a nonpolar aprotic organic solvent in the presence of a base to obtain a compound of the formula



Ia

wherein R_1, R_2, R_3, R_4, R_5, R_6, R_9 and n are as described above.

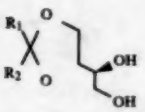
4,931,575

CHIRAL GLYCEROL DERIVATIVES

Elie Abushanab, Peace Dale, R.I., assignor to The Board of Governors for Higher Education, State of Rhode Island and Providence Plantations, Providence, R.I.

Filed Mar. 13, 1987, Ser. No. 25,624
Int. Cl.[5] C07D 317/20, 317/22
U.S. Cl. 549—453 12 Claims

1. A compound of the formula



wherein

R_1 and R_2 are each a lower alkyl, or R_1 and R_2 collectively form arylidene in which one of R_1 and R_2 is a hydrogen atom and the other is a phenyl or naphthyl group.

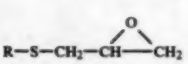
4,931,576

PROCESS FOR PRODUCING GLYCIDYL THIOETHERS

Hermann O. Wirth, Bensheim, and Hans-Helmut Friedrich, Lautertal, both of Fed. Rep. of Germany, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 18,793, Feb. 20, 1987, abandoned, which is a continuation of Ser. No. 750,618, Jul. 1, 1985, abandoned. This application Jun. 28, 1988, Ser. No. 213,509
Claims priority, application Switzerland, Jun. 29, 1984, 3148/84
Int. Cl.[5] C07D 303/34
U.S. Cl. 549—514 7 Claims

1. A process for producing a glycidyl thioether of formula I



(I)

which process comprises reacting epichlorohydrin with a mercaptan of the formula II

(II)

in which R can be a radical

wherein R^1, R^2 and R^3 independently of one another are each C_1–C_{18}-alkyl, and together contain no more than 22 C atoms, and R^2 and R^3 are in addition hydrogen, or wherein R is C_5–C_6-cycloalkyl, phenyl or naphthyl unsubstituted or substituted by C_1–C_4-alkyl, or is benzyl or furfuryl, or wherein R is C_2–C_8-alkylene which is substituted by —SH and which can be interrupted by 1 or 2 ether-O atoms, in an equimolar amount, without organic solvent and in the presence of a base, said base being an alkali metal hydroxide or alkaline earth metal hydroxide, said base being used in an equimolar amount or in slight excess amount relative to the mercaptan, the reaction being performed in the presence of a phase-transfer catalyst wherein the phase-transfer catalyst is a quaternary salt, a polyether or an N-alkylphosphoramide, at a reaction temperature of −30° C. to +20° C.

4,931,577

NOVEL ORGANIC MERCURIAL DERIVATIVES WITH ANTISEPTIC CHARACTER

Michel Bourgeois, Lyon; Roger Chatelin, and Daniel Wattiez, both of Lozanne, all of France, assignors to Institut Textile de France, Bagneux Cedex, France

Filed Oct. 7, 1988, Ser. No. 254,734
Claims priority, application France, Oct. 8, 1987, 87 14157
Int. Cl.[5] C07F 3/12; C08F 216/14
U.S. Cl. 556—123 5 Claims

1. An antiseptic mercurial derivative, which does not comprise any hydroxy group attached to a benzene ring, comprising:

(a) at least one benzene ring having no hydroxy group attached thereto,

(b) at least one radical HgX in which X is selected from F, Cl, Br, I, OH, CH_3COO, CN, SCH, NO_3, $OB(OH)_2$,

(c) and, bonded to the benzene ring, at least one group —OR or —COOR in which R is a functional group capable of polymerization or polyaddition.

4,931,578

PROCESS FOR THE PRODUCTION OF TRIALKOXYSILANES

Yoshiro Ohta, 2113-12, Kamiida-chou, Izumi-ku, Yokohama-shi, Kanagawa-ken, and Mamoru Yoshizako, 131-21, Miwa-chou, Machida-shi, Tokyo, both of Japan

Filed Feb. 22, 1988, Ser. No. 158,480
Claims priority, application Japan, Feb. 23, 1987, 62-37895; May 21, 1987, 62-122455; Jun. 16, 1987, 62-147886
Int. Cl.[5] C07F 7/18
U.S. Cl. 556—470 12 Claims

1. A process for producing trialkoxysilanes, comprising:

(a) contacting silicon with a copper catalyst to create a mixture and activating the mixture;

(b) reacting an alcohol with the activated silicon and copper mixture to produce a reaction mixture containing trialkoxysilanes;

(c) purifying the reaction mixture; and

introducing an organic halide into any one of steps a–c above.

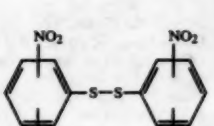
4,931,579

INDICATORS FOR THE DETECTION OF THIOL GROUPS

Holger Heidenreich, Cologne, and Klaus Wehling, Wuppertal, both of Fed. Rep. of Germany, assignors to Miles Inc., Elkhart, Ind.

Continuation-in-part of Ser. No. 105,565, Oct. 8, 1987, abandoned. This application Nov. 7, 1989, Ser. No. 432,466
Claims priority, application Fed. Rep. of Germany, Oct. 10, 1986, 3634525
Int. Cl.[5] C07C 137/00, 141/00, 143/68, 145/00
U.S. Cl. 558—29 2 Claims

1. The compound having the general formula



wherein

R^1 is —O—R^2,

and

R^2 is C_1–C_4-alkyl; C_1–C_4 alkyl substituted by halogen, —COOH, cyano, C_1–C_4-alkoxy, hydroxyl, —OSO_3H, —SO_3H amino; or amino substituted by C_1–C_4-alkyl; wherein the C_1–C_4 alkyl may be substituted by halogen, hydroxyl, cyano, —OSO_3H, —SO_3H, phenyl or a benzyl group.

4,931,580

ARYL SULFONYLUREA CARBAMATES AND THIOLCARBAMATES AND SALTS THEREOF: HERBICIDAL ANTIDOTES

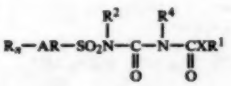
Ferenc M. Pallos, 136 Twin Peaks Dr., Walnut Creek, Calif. 94598; Kang-Chi Lin, 7458 Terrace Dr., El Cerrito, Calif. 94530, and Laddie L. Green, 4345 Sherbourne Dr., San Jose, Calif. 95124

Continuation of Ser. No. 312,251, Oct. 19, 1981, abandoned, which is a continuation-in-part of Ser. No. 207,991, Nov. 19, 1980, abandoned. This application Dec. 23, 1983, Ser. No. 564,981

Int. Cl.[5] C07C *147/13*

U.S. Cl. 560—13 **37 Claims**

1. Compounds having the formula



in which X is oxygen; n is an integer 0 to 3, inclusive;

R is lower alkyl having 1 to 4 carbon atoms, inclusive, lower alkoxy having 1–4 carbon atoms, inclusive, lower alkylthio having 1 to 4 carbon atoms, inclusive, halogen, trifluoromethyl, nitro, lower alkyl sulfonyl;

R^4 is hydrogen and lower alkyl having 1 to 4 carbon atoms, inclusive lower alkoxyalkyl having 2 to 6 carbon atoms, inclusive, phenyl and chlorophenyl;

R^2 is hydrogen, lower alkyl having 1 to 4 carbon atoms, alkoxyalkyl having 2–6 carbon atoms, and phenyl;

R^1 is lower alkyl having 1 to 4 carbon atoms, inclusive, alkenyl having 3 to 6 carbon atoms, inclusive, alkynyl having 3 to 6 carbon atoms, inclusive, haloalkyl having 1 to 4 carbon atoms, inclusive, alkoxyalkyl having 2 to 6 carbon atoms, inclusive, 1-phenyl propenyl, benzyl, chlorobenzyl, haloalkenyl having 3 to 6 carbon atoms, inclusive, phenyl and alkyl substituted phenyl wherein the alkyl moiety has 1 to 4 carbon atoms, inclusive; and

AR is phenyl, benzyl, naphthyl or styryl; and the inorganic base salts sodium, potassium, ammonium and other inorganic salts and organic base salts thereof selected from the group aniline, p-toluidine, benzylamine, allylamine, diallylamine, triallylamine, alkylamine, dialkylamine, trialkylamine, tetraalkyl ammonium, ethylaminoethyl, alkanolamine, dialkanolamine, trialkanolamine, quinoline, isoquinoline, ethylenediamine, benzyltrialkyl ammonium, choline, hydrazine, N,N-dialkyl hydrazine and tribenzylamine.

4,931,581

PROCESS AND A COMPOSITION FOR IMMUNIZING PLANTS AGAINST DISEASES

Rolf Schurter, Binningen; Walter Kunz, Oberwil, and Robert Nyfeler, Basel, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

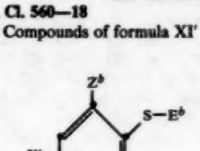
Filed Aug. 18, 1988, Ser. No. 234,241

Claims priority, application Switzerland, Aug. 21, 1987, 3229/87

Int. Cl.[5] C07C *149/43*

U.S. Cl. 560—18 **1 Claim**

1. Compounds of formula XI′

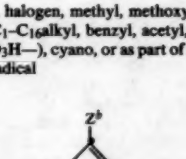


(XI′)

in which:

X′ is hydrogen, halogen, methyl, methoxy or COOH;

E^b hydrogen, C_1–C_{16}alkyl, benzyl, acetyl, the sulfonic acid radical (—SO_3H—), cyano, or as part of a disulfide bridge, is a second radical



in which:

Z^b is cyano or COA;

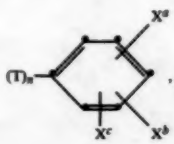
A is UR, $N(R_1)R_2$ or $U^1N(=C)_n(R_3)R_4$;

M is the molar equivalent of an alkali metal or alkaline earth metal ion that has been formed from a corresponding base or basic compound;

U is oxygen or sulfur;

U^1 is oxygen or —$N(R_3)$—;

R is C_1–C_8alkyl, C_1–C_8alkyl that is substituted by halogen, cyano, hydroxy or by U—C_1–C_3alkyl, (T)—COOH or (T)—COOC_1–C_4alkyl, C_3–C_6alkenyl, halo-substituted C_3–C_6alkenyl, C_3–C_6alkynyl, halo-substituted C_3–C_6-alkynyl, $(T)_n$—C_3–C_8cycloalkyl, or a group selected from the following:



, $(T)_n$-napht and $(T)_n$—W;

each of X^a, X^b and X^c, independently of the others, is hydrogen, halogen, hydroxy, cyano, HOOC, MOOC, C_1–C_3alkyl-OOC, C_1–C_4alkyl, C_1–C_4alkoxy, C_1–C_2-haloalkyl having up to 5 halogen atoms; or

X^a is C_1–C_2haloalkoxy having up to 5 halogen atoms, phenyl, phenoxy, benzyloxy or sulfamoyloxy and X^b and X^c are both hydrogen; or

X^a is phenyl, phenoxy or benzyloxy and X^b is halogen or methyl and X^c is hydrogen; or

X^a, X^b and X^c together are 4 or 5 fluorine atoms;

naphth is a naphthyl radical that is unsubstituted or is substituted by halogen, methyl or by methoxy;

W is a 5- to 7-membered saturated or unsaturated heterocycle having from 1 to 3 hetero atoms from the group O, N and S that is unsubstituted or is substituted by halogen, trifluoromethyl, cyano, C_1–C_2alkyl or by a C_1–C_2-alkoxycarbonyl-C_2–C_4alkyleneimino radical, or is a monosaccharide radical;

T is a bridge member $—CH_2—$, $—CH_2CH_2—$, $—CH(CH_3)—$, $—CH_2CH_2CH_2—$ or $—CH_2CH_2O—$;

R_1 is C_1–C_5alkyl, C_1–C_5alkyl interrupted by an oxygen or sulfur atom, C_1–C_5alkyl substituted by halogen, cyano, HOOC or by C_1–C_2alkyl-OOC, C_1–C_5alkyl interrupted by an oxygen or sulfur atom and substituted by halogen, cyano, HOOC or by C_1–C_2alkyl-OOC, C_3–C_5alkenyl, C_3–C_5-alkenyl substituted by C_1–C_3alkyl-OOC, C_3–C_5alkynyl, C_3–C_5-alkynyl substituted by C_1–C_3alkyl-OOC, $(T)_n$—C_3–C_6cycloalkyl, $(T)_n$—C_3–C_6cycloalkyl substituted by C_1–C_3alkyl-OOC, $(T)_n$-phenyl, or $(T)_n$-phenyl substituted in the phenyl moiety by halogen, hydroxy, methyl, CF_3, cyano, methoxy, HOOC or by MOOC;

R_2 is hydroxy, C_1–C_3alkyl, C_1–C_3alkyl substituted by cyano or by C_1–C_3-alkoxy, C_1–C_4alkoxy, or a 3- to 6-membered saturated or unsaturated heterocycle containing O, N or S as hetero atoms;

R_1 and R_2 together are a heterocycle W;

R_3 is hydrogen, cyano, C_1–C_6alkyl, phenyl, phenyl substituted by halogen, hydroxy, methyl, methoxy, HOOC or by MOOC, or a heterocycle W;

R_4 is C_1–C_6alkyl, C_1–C_6alkanoyi, C_1–C_3alkanoyl substituted by halogen or by C_1–C_3alkoxy, C_3–C_5alkenoyl, or C_3–C_5alkenoyl substituted by halogen or by C_1–C_3alkoxy;

R_3 and R_4 together are a heterocycle W or a carbocyclic ring W';

W' is a carbocyclic radical having from 3 to 7 ring carbon atoms;

R_5 is methyl;

R_6 is hydrogen or C_1–C_4alkyl; and

n is 0 or 1.

4,931,582

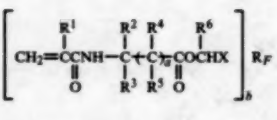
FLUORINATED, ACRYLAMIDE-FUNCTIONAL MONOMERS

Steven M. Heilmann; Larry R. Krepski; Dean M. Moren; Jerald K. Rasmussen, and Howell K. Smith, II, all of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Nov. 4, 1988, Ser. No. 267,186
Int. Cl.[5] C07C *103/48*
U.S. Cl. 560—172 **5 Claims**

1. A compound having the formula

III



wherein

R^1 and R^6 are independently hydrogen or methyl;

R^2 and R^3 independently are alkyl, cycloalkyl, or aryl group, or R^2 and R^3 taken together with the carbon to which they are joined form a carbocyclic ring containing 4 to 12 ring atoms;

R^4 and R^5 are independently hydrogen or lower alkyl;

a is 0 or 1;

b is 1 or 2;

X is a single bond, CH_2, CH_2OCH_2, or $CH_2CH_2OCH_2$; and

R_F is an alkyl, cycloalkyl, or aryl group when b is 1 and alkylene when b is 2, wherein at least 50 percent of the hydrogen atoms have been replaced by fluorine.

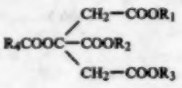
4,931,583

CITRATE ESTERS

Ezekiel H. Hull, Greensboro, and Edward P. Frappier, Kernersville, both of N.C., assignors to Morflex Chemical Compay, Inc., Greensboro, N.C.

Continuation of Ser. No. 217,217, Jul. 11, 1988, Pat. No. 4,892,967, which is a division of Ser. No. 117,080, Nov. 4, 1987, Pat. No. 4,789,700, which is a continuation of Ser. No. 865,874, May 21, 1986, Pat. No. 4,711,922, which is a continuation of Ser. No. 735,149, May 17, 1985, abandoned, which is a continuation-in-part of Ser. No. 619,583, Jun. 11, 1984, abandoned. This application Jun. 15, 1989, Ser. No. 366,540
Int. Cl.[5] C07C *69/704*
U.S. Cl. 560—180 **15 Claims**

1. A citrate ester of the formula:



where R_1, R_2, and R_3=CH_3 to $C_{18}H_{37}$, R_4=CH_3 to C_7H_{15}, wherein said ester has heat stability characteristics, after heating at 150° C. for two hours, of a color not greater than 50–60 APHA and a mild odor at 25° C.

4,931,584

PROCESS FOR THE PREPARATION OF MONOESTERS OR DIESTERS OF 9,10-ENDOETHANO-9,10-DIHYDROANTHRACENE-11,11-DICARBOXYLIC ACID NOVEL MONOESTERS OF DIESTERS PREPARED BY THIS PROCESS AND USE THEREOF FOR THE PREPARATION OF SYMMETRICAL OR ASYMMETRICAL METHYLIDENEMAL

Nicole Bru-Magniez, Paris, France; Christian De Cock, St Genese, Belgium; Jacques Poupaert, Ottignies-Louvain la Neuve, Belgium; Jean-Luc De Keyser, Tervuren, Belgium, and Pierre Dumont, Gembloux, Belgium, assignors to Laboratoires UPSA, France

Filed Mar. 1, 1988, Ser. No. 162,573
Claims priority, application France, Mar. 5, 1987, 87 02991
Int. Cl.[5] C07C *67/343*
U.S. Cl. 560—190 **12 Claims**

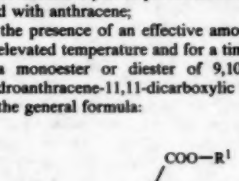
1. A process for the preparation of a monoester or diester of 9,10-endoethano-9,10-dihydroanthracene-11,11-dicarboxylic acid, comprising:

contacting a malonic acid ester;

with formaldehyde or paraformaldehyde;

and with anthracene;

in the presence of an effective amount of a catalyst, at an elevated temperature and for a time, sufficient to prepare a monoester or diester of 9,10-endoethano-9,10-dihydroanthracene-11,11-dicarboxylic acid corresponding to the general formula:



wherein R^1 and R^2 each, independently is hydrogen, a linear or branched alkyl radical having from 1 to 6 carbon atoms, an alkenyl radical having from 2 to 6 carbon atoms, or an alkynyl radical having from 2 to 6 carbon atoms, or R^1 and R^2 together form an alicyclic radical having from 3 to 6 carbon atoms, the alkyl, alicyclic, alkenyl, and

alkynyl radicals optionally substituted with one or more ether, epoxy, halo, cyano, ester, aldehyde, keto, aryl, or hydroxy functional groups, with the proviso that R^1 and R^2 cannot both be hydrogen.

4,931,585

PROCESS FOR PREPARING N-PHOSPHONO-METHYL-IMINO-DIACETIC ACID

Jenő Pelyva, Füzfőgyártelep; Csaba Sőptei, Veszprém; Zoltán Kolonics, Balatonalmádi; Béla Karácsonyi, Budapest; Sándor Bálint; Jánosné Benczik, both of Balatonalmádi; Csaba Kayos, Veszprém; László Lendvai, and Sándor László, both of Füzfőgyártelep, all of Hungary, assignors to Nitrokémia Ipartelepek, Fuzfőgyártelep, Hungary

Filed Feb. 2, 1989, Ser. No. 306,032

Claims priority, application Hungary, Feb. 8, 1988, 2251-562/88

Int. Cl.[5] C07F 9/38

U.S. Cl. 562—17 3 Claims

1. A process for preparing N-phosphonomethyl-imino-diacetic acid which comprises the steps of

(a) forming an imino-diacetic acid calcium salt by reacting monochlor-acetic acid, ammonia and calcium hydroxide;

(b) heating the calcium salt of imino-diacetic acid with concentrated hydrochloric acid in a molar ratio of from 2–3 to 1 at a temperature between 50° and 100° C. to form imino-diacetic acid HCl;

(c) recovering by filtration the imino-diacetic acid HCl;

(d) dissolving the recovered imino-diacetic acid HCl in water to form a solution;

(e) reacting the solution while stirring, by heating it with phosphorous acid in a molar ratio of from 1.0–1.2:1, based on the imino-diacetic acid HCl and with an aqueous solution of formaldehyde in a molar ratio of from 1.0–1.4:1;

(f) cooling the reaction mixture to precipitate the N-phosphonomethyl-imino-diacetic acid, and

(g) filtering the precipitated N-phosphonomethyl-imino-diacetic acid.

4,931,586

PROCESS FOR THE CONTINUOUS PRODUCTION OF 2-PHOSPHONE-BUTANE-1,2,4-TRICARBOXYLIC ACID AND ALKALI METAL SALTS THEREOF

Roland Kleinstück, Bergisch Gladbach; Cornelia Lensch, Wermelskirchen; Michael Immenkeppel, Bonn; Hans-Dieter Block, and Herbert Odenbach, both of Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Aug. 16, 1989, Ser. No. 394,592

Claims priority, application Fed. Rep. of Germany, Sep. 3, 1988, 3829961

Int. Cl.[5] C07F 9/38, 9/40

U.S. Cl. 562—24 8 Claims

1. A process for the continuous production of 2-phosphonobutane-1,2,4-tricarboxylic acid or alkali metal salts thereof from dialkylphosphite, ethene-1,2-dicarboxylic acid dialkyl ester and alkyl acrylate, comprising preparing phosphonosuccinic acid tetraalkyl ester by reacting dialkylphosphite and ethene-1,2-dicarboxylic acid dialkyl ester in the presence of an alkaline catalyst, at temperatures in the range from 0° to 100° C., reacting the phosphonosuccinic acid tetraalkyl ester thus produced without purification or concentration with alkyl acrylate in the presence of an alkaline catalyst, at temperatures of from −20° to 80° C. to form 2-phosphonobutane-1,2,4-tricarboxylic acid pentaalkyl ester and subjecting the pentaalkyl ester thus produced without intermediate purification or concentration to acidic hydrolysis at a temperature in the range from 100° to 150° C.

4,931,587

PROCESS FOR THE OPTICAL RESOLUTION OF A RACEMIC ACID

Fulvio L. Piselli, Milan, Italy, assignor to Industria Chimica Profarmaco S.p.A., Milan, Italy

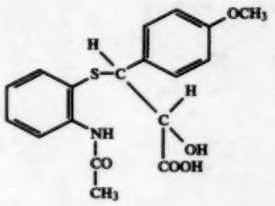
Filed Jan. 17, 1989, Ser. No. 297,993

Claims priority, application Italy, Jan. 28, 1988, 19234 A/88

Int. Cl.[5] C07B 57/00

U.S. Cl. 562—401 9 Claims

1. A process for the optical resolution of racemate (2S,3S)(2R,3R)-2-hydroxy-3-(4-methoxyphenyl)-3-(2-acetylaminophenylthio)propionic acid of formula I



(I)

into the corresponding enantiomers, which process consists in subjecting the sodium salts of said racemic mixture to separation by means of supersaturation and seeding crystallization and obtaining the corresponding (2S,3S)- and (2R,3R)-2-hydroxy-3-(4-methoxyphenyl)-3-(2-acetylaminophenylthio)-propionic acids from the thus separated enantiomeric sodium salts by means of acidification with acetic acid or mineral acids.

4,931,588

COMPOUNDS USABLE IN A TONER FOR DEVELOPING ELECTROSTATIC LATENT IMAGES

Yoji Kawagishi, Kyoto; Shinichi Narita, Osaka; Takashi Kiriu, Osaka, and Schunichiro Yamanaka, Osaka, all of Japan, assignors to Orient Chemical Industries, Ltd., Osaka, Japan

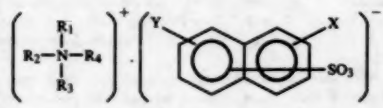
Division of Ser. No. 852,994, Apr. 17, 1986, Pat. No. 4,826,749. This application Sep. 15, 1989, Ser. No. 292,329

Claims priority, application Japan, Jun. 28, 1985, 60-143380; Sep. 25, 1985, 60-213140

Int. Cl.[5] C07C 87/30

U.S. Cl. 562—68 8 Claims

1. Compound represented by the formula



(I)

wherein R_1 is C_1–C_8 alkyl or benzyl, R_2 and R_3 are each C_1–C_{18} alkyl, R_4 is C_1–C_{18} alkyl or benzyl, X is hydroxyl or amino, and Y is hydroxyl or hydrogen and is not hydrogen when X is hydroxyl.

4,931,589

BENZONORBORNENE DERIVATIVES, PROCESSES FOR THEIR PREPARATION AND MEDICINAL AND COSMETIC COMPOSITIONS CONTAINING THEM

Gérard Lang, Saint-Gratien; Jean Maignan, Tremblay les Gonesse; Serge Restle, Aulnay sous Bois, and Braham Shroot, Antibes, all of France, assignors to L'Oreal, Paris, France

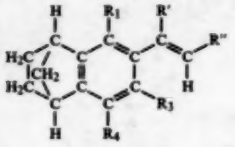
Continuation of Ser. No. 772,525, Sep. 4, 1985, Pat. No. 4,783,549. This application Jul. 13, 1988, Ser. No. 218,204

Claims priority, application Luxembourg, Sep. 5, 1984, 85531; Dec. 20, 1984, 85700

Int. Cl.[5] C07C *63/36*

U.S. Cl. 562—490 23 Claims

1. A benzonorbornene derivative of formula (I) or an isomer or salt thereof having the formula



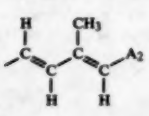
(I)

wherein

R_1, R_3 and R_4 each independently represent hydrogen, C_1–C_8 alkyl, C_1–C_8 alkoxy, halogen, C_1–C_8 acyloxy or hydroxyl,

R' is hydrogen or C_1–C_6 alkyl, and

R" is a polyene having formula (II)



(II)

wherein

A_2 is CH_2OR_6 wherein R_6 is hydrogen or C_1–C_6 alkyl, or —COR_7 wherein R_7 is hydrogen, C_1–C_6 alkoxy, aryloxy, benzyloxy, a residue of mannitol or glucose, substituted or unsubstituted amino, C_1–C_6 alkyl or hydroxyl.

4,931,590

PREPARATION OF ADIPIC ACID

Rudolf Kummer; Franz Merger, both of Frankenthal; Werner Bertleff, Viernheim, and Rolf Fischer, Heidelberg, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Jun. 10, 1988, Ser. No. 205,340

Claims priority, application Fed. Rep. of Germany, Jun. 15, 1987, 3719936

Int. Cl.[5] C07C *55/14, 27/02*

U.S. Cl. 562—590 13 Claims

1. A process for the preparation of adipic acid which comprises the following steps:

(a) hydroformylation of a pentenoic ester by reaction with carbon monoxide and hydrogen at elevated temperatures and under superatmospheric pressure in the presence of a cobalt carbonyl or rhodium carbonyl complex with formation of a mixture of 5-, 4- and 3-formylvaleric esters,

(b) isolation of the 5-formylvaleric ester from the resulting mixture of 5-, 4- and 3-formylvaleric esters, a mixture essentially consisting of 4- and 3-formylvaleric esters remaining,

(c) dehydrocarbonylation of the mixture consisting essentially of 4- and 3-formylvaleric esters in the presence of one or more elements of subgroup 8 of the Periodic Table at from 50° to 400° C. with formation of pentenoic esters, and recycling of the latter to stage (a) for hydroformylation,

(d) oxidation of the 5-formylvaleric ester from stage (b) with molecular oxygen or a gas containing molecular oxygen to give a monoester of adipic acid, and

(e) hydrolysis of the monoester of adipic acid to give adipic acid.

4,931,591

NOVEL 5-AMINO-4-HYDROXYVALERYL DERIVATIVES

Peter Bühlmayer, Ariesheim; Vittorio Rasetti, Basel; Walter Fuhrer, Lupsingen; James L. Stanton, Basel, and Richard Göschl, Bottmingen, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

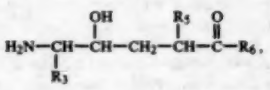
Continuation of Ser. No. 123,618, Dec. 28, 1987, abandoned, which is a divisi[illegible] of Ser. No. 794,914, Nov. 4, 1985, Pat. No. 4,727,060. This application Jul. 12, 1989, Ser. No. 380,711

Claims priority, application Switzerland, Nov. 13, 1984, 5426/84; Jul. 17, 1985, 3094/85

Int. Cl.[5] C07C *103/00, 103/20, 103/14, 103/24*

U.S. Cl. 564—165 4 Claims

1. Compounds of the formula



(VIII)

wherein R_3 represents hydrogen, hydroxy-lower alkyl, etherified or esterified hydroxy-lower alkyl, cycloalkyl, cycloalkyl-lower alkyl, bicycloalkyl-lower alkyl, tricycloalkyl-lower alkyl, aryl or aryl-lower alkyl, R_5 represents lower alkyl having 2 or more carbon atoms, hydroxy-lower alkyl, etherified or esterified hydroxy-lower alkyl, cycloalkyl, cycloalkyl-lower alkyl, bicycloalkyl, bicycloalkyl-lower alkyl, tricycloalkyl, tricycloalkyl-lower alkyl, aryl, aryl-lower alkyl, carbamoyl, substituted carbamoyl, amino, substituted amino, hydroxy, substituted hydroxy, mercapto or substituted mercapto and R_6 represents substituted amino with the exception of an amino residue derived from an alpha-amino acid, and salts of such compounds having salt-forming groups.

4,931,592

STORABILITY OF MOLTEN CYCLOHEXANONE OXIME

Hugo Fuchs, Ludwigshafen; David Agab, Rimbach; Gerald Neubauer, Weinheim, and Josef Ritz, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Oct. 31, 1989, Ser. No. 429,799

Claims priority, application Fed. Rep. of Germany, Nov. 23, 1988, 3839448

Int. Cl.[5] C07C *131/04*

U.S. Cl. 564—267 7 Claims

1. A process for improving the storability of a molten cyclohexanone oxime containing from 0.5 to 15% by weight of cyclohexanone and from 1 to 8% by weight of aqueous ammonium bisulfate solution by washing the molten cyclohexanone oxime with a 10–42% strength by weight aqueous ammonium sulfate solution and maintaining a pH of 4.5–5.8.

4,931,593

METHOD FOR PRODUCING TETRAPROPYLAMMONIUM BROMIDE

Mustafa Siray, and Peter Kleinschmit, both of Hanau, Fed. Rep. of Germany, assignors to Degussa Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Mar. 20, 1989, Ser. No. 325,938

Claims priority, application Fed. Rep. of Germany, Mar. 31, 1988, 3810953

Int. Cl.[5] C07C *87/30*

U.S. Cl. 564—296 1 Claim

1. A method for producing tetrapropylammonium bromide

comprising reacting tripropylamine with propyl bromide in dimethylformamide at a temperature between 60° and 160° C.

4,931,594

METHOD FOR MAKING AROMATIC BISPHENOLS

Joachim Knebel, Darmstadt; Volker Kerscher, Reinheim, and Werner Ude, Darmstadt-Arheilgen, all of Fed. Rep. of Germany, assignors to Röhm GmbH, Darmstadt, Fed. Rep. of Germany

Filed Oct. 26, 1988, Ser. No. 262,899

Claims priority, application Fed. Rep. of Germany, Oct. 30, 1987, 3736814

Int. Cl.[5] C07C *39/17, 39/12, 37/20*

U.S. Cl. 568—727 8 Claims

1. A method for making 9,9-bis(4-hydroxyphenyl)fluorene which comprises reacting fluorenone with phenol at a temperature from 20° C. to 150° C. in the presence of an insoluble, strongly acidic cationic ion exchange resin as a condensation catalyst.

4,931,595

CATALYTIC HYDROLYSIS PROCESS FOR POLYAMINES

Werner Rasshofer, Cologne, Fed. Rep. of Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 239,143, Aug. 31, 1988, abandoned, which is a continuation of Ser. No. 908,535, Sep. 16, 1986, abandoned. This application Aug. 2, 1989, Ser. No. 389,384

Claims priority, application Fed. Rep. of Germany, Oct. 1, 1985, 3534947

Int. Cl.[5] C07C *85/00*

U.S. Cl. 564—393 14 Claims

1. A one step process for the production of polyamines containing primary amino groups comprising hydrolyzing

(a) a compound containing NCO groups with an NCO content of from 0.5 to 40% by weight

with

(b) at least one mole of water for each equivalent of NCO groups in (a) in the presence of

(c) a catalyst compound having at least one NCO-reactive group that is incorporated into (a) and having a catalytic group that catalyzes the reaction of NCO groups with NH_2 groups, wherein said catalytic group is selected from

(1) an aromatic carboxylic acid or pheolic group, wherein said group has been at least partially neutralized,

(2) a basic group containing one or more nitrogen atoms that are not reactive in an isocyanate addition reaction, and

(3) hydroxy-, amino-, or mercapto-containing organotin, organolead, organotitanium, or organobismuth groups, and

(d) at least 10% by weight, based on 100% by weight of (a), of a water-miscible aprotic dipolar solvent,

at a temperature of from 20 to 210° C., in a manner such that the reaction mixture remains substantially homogeneous during the hydrolysis.

4,931,596

PROCESS FOR PREPARING HYDROXYLATED AMINES

Kathleen S. Laurenzo, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Filed Jan. 3, 1989, Ser. No. 292,831

The portion of the term of this patent subsequent to Dec. 19, 2006, has been disclaimed.

Int. Cl.[5] C07C *213/03, 321/14, 215/08, 269/04*

U.S. Cl. 564—477 8 Claims

1. A process for preparing an hydroxylated primary amine corresponding to the formula:

$$R-X-CH_2-CH(OH)-CH_2NH_2 \quad (I)$$

wherein R is a saturated or unsaturated straight chain C_5–C_{18} aliphatic radical and X represents —O—, —S—, —NH— or —CH_2— which comprises reacting a compound corresponding to the formula:

$$R-X-CH_2-\underset{\displaystyle R_2}{\underset{|}{CH}}-CH_2R_1 \quad (II)$$

in which R and X are as defined previously and R_1 and R_2 together represent an epoxy radical with ammonium carbamate to form a compound corresponding to the formula:

$$R-X-CH_2-CH(OH)-CH_2-NH-CO_2^- \quad (III)$$

$$R-X-CH_2-CH(OH)-CH_2-\overset{+}{N}H_3$$

in which R and X are as defined previously and thereafter heating the compound of formula (III) at a temperature and for a length of time sufficient to form the corresponding hydroxylated primary amine of formula (I).

4,931,597

JUNCTION BOXES

Robert L. Kinbrough, Oxford, Ohio, and Donald L. Chapman, Liberty, Ind., assignors to Square D Company, Palatine, Ill.

Filed Dec. 12, 1988, Ser. No. 283,424
Int. Cl.[5] H02G 3/08
U.S. Cl. 174—48 26 Claims

1. A junction box apparatus for an electrical raceway system to be placed in a floor, comprising:

a base having a plurality of duct opening means disposed therethrough for receiving a plurality of ducts with said ducts communicating with an interior of said base;

an access means, located above and connected to said base, for permitting access downward into said interior of said base, said access means having an access opening defined therethrough; and

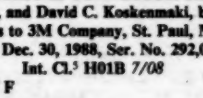
a removable tunnel insert means, located in said interior of said base, for defining a plurality of passages communicating said plurality of duct opening means, said tunnel insert means being so constructed and dimensioned that it can be inserted downward through said access opening into place within said interior of said base after said base and said access means are connected together.

4,931,598

ELECTRICAL CONNECTOR TAPE

Clyde D. Calhoun, and David C. Koskenmaki, both of St. Paul, Minn., assignors to 3M Company, St. Paul, Minn.

Filed Dec. 30, 1988, Ser. No. 292,050
Int. Cl.[5] H01B 7/08
U.S. Cl. 174—117 F 23 Claims



1. A sheet material adapted to make bonded electrical connections to an array of closely spaced conductive terminal pads comprising:

(1) a thin, flexible insulating substrate; and

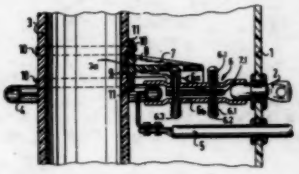
(2) a plurality of longitudinally extending, regularly spaced, metal conductive members, supported and held on the insulating substrate, said members individually comprising a fine metal strand having a cross-section with an area of about 100 to 100,000 μm^2, said cross-section having a flat portion and an arcuate portion.

4,931,599

STEP SELECTOR FOR A STEPPED TRANSFORMER

Alexander Bleibtreu, Regensburg, Fed. Rep. of Germany, assignor to Maschinenfabrik Reinhausen GmbH, Regensburg, Fed. Rep. of Germany

Filed Aug. 3, 1989, Ser. No. 389,423
Claims priority, application Fed. Rep. of Germany, Aug. 12, 1988, 3827385
Int. Cl.[5] H01H 19/58, 1/50
U.S. Cl. 200—11 B 7 Claims



1. A cylindrical step selector for a stepped transformer, comprising:

a cylinder having an electrically insulating wall;

a fixed contact for switching a transformer step mounted in said wall in a plane perpendicular to an axis of the cylindrical wall;

a generally cylindrical rotatable switching shaft of electrically insulating material disposed along said axis inwardly of said cylinder wall;

an electrically conductive contact ring lying generally in said plane and surrounding said shaft without rotatable entrainment by said shaft;

a bridge support affixed to said shaft, said support being formed with:

a generally radial arm;

a flange at one end of said arm shaped to conform to said shaft and fitting around said shaft over substantially 120° thereof,

a projection formed on said flange and engaged in a recess formed in said shaft, and

at least one self-hardening insulating band of a resin impregnated material wrapped around said shaft and said flange and securing said bridge support to said shaft;

an electrically conductive contact bridge carried by the other end of said arm and slidably engaging said contact ring and engageable with said fixed contact; and

means forming an electrical connection with said contact ring.

4,931,600

CYLINDER KEY SWITCH

Peter B. Braun, Boraheim, Fed. Rep. of Germany, assignor to DOM-Sicherheitstechnik GmbH & Co. KG, Bruhl, Fed. Rep. of Germany

Filed Jul. 6, 1988, Ser. No. 215,710
Claims priority, application Fed. Rep. of Germany, Aug. 3, 1987, 8710596[U]
Int. Cl.[5] H01H 27/06
U.S. Cl. 200—43.08 15 Claims

1. A cylinder-operable key switch comprising:

a cylinder housing having a first axially extending bore;

a cylinder core rotatably mounted within said first axially extending bore of said cylinder housing;

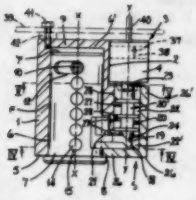
said housing having a second bore extending generally parallel to and laterally offset from said first bore;

an electrical switching element disposed in substantially axial alignment with said second bore;

an axially movable control pin mounted in said second bore and having an operative position contacting said switching element and an inoperative position;

a control member connected to said cylinder core for rota-

tion therewith and extending laterally into said second bore for selectively axially driving said control pin to its operative position; and



wherein said second bore forms a housing channel which is open on one longitudinal side of said cylinder housing.

4,931,601

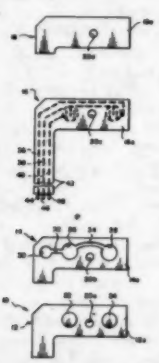
PRESSURE SWITCH HAVING INTERNAL VENT CHAMBER

William J. Lavender, Batavia, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 23, 1989, Ser. No. 313,790

Int. Cl.[5] H01H *35/34*

U.S. Cl. 200—83 N **5 Claims**



1. A switch adapted to be closed in response to pressure exerted on the switch, the switch comprising:

a plurality of thin layers of an electrically insulating material;

a first one of the layers having on a surface thereof an area of an electrically conductive material;

a second one of the layers in contact with the surface of the first layer, the second layer having an opening therethrough aligned with the area of conductive material on the first layer;

a third one of the layers, in contact with the second layer, the third layer having on a surface thereof, facing the second layer, an area of an electrically conductive material aligned with the opening in the second layer, the layers being sufficiently flexible to enable the areas of electrically conductive material to be brought into engagement by pressure exerted on the switch; and

means communicating with the opening and defining an internal vent chamber for reducing air pressure build up in the opening when the areas of electrically conductive material are brought into contact, the vent chamber being fully enclosed within the layers and hermetically sealed from the environment external to the switch.

4,931,602

MULTIPOLE CIRCUIT BREAKER

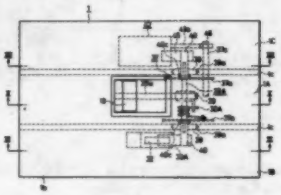
Haruhisa Toda; Kouhei Fujiwara; Setsuo Hosogai, and Kazumi Shioguchi, all of Hiroshima, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 28, 1988, Ser. No. 187,127

Claims priority, application Japan, May 28, 1987, 62-84271; May 28, 1987, 62-84270; May 28, 1987, 62-84283; May 28, 1987, 62-84272; May 28, 1987, 62-84273

Int. Cl.[5] H01H *33/02*

U.S. Cl. 200—144 R **11 Claims**



1. A multipole circuit breaker provided with a mechanism pole having a switching mechanism, and adjacent poles each disposed in opposition to said mechanism pole with an interphase wall disposed therebetween and each having an internal attachment comprising an alarm switch but having no switching mechanism, said circuit breaker comprising: a latch engaged with a cradle of said switching mechanism and arranged to be actuated by an automatic tripping device, a supporting shaft for rotatably supporting said latch, a lever fixed on said supporting shaft so as to engage with said cradle, means for urging said lever in a direction to trip said cradle, actuators fixed on said supporting shaft so as to engage with said internal attachments of respective ones of said adjacent poles, said supporting shaft being made of metal, and insulating caps inserted and fixed onto end portions of said supporting shaft so that said supporting shaft is passed at portions of said insulating caps through said interphase walls and said actuators are inserted and fixed onto said insulating caps.

4,931,603

MOLDED CASE CIRCUIT BREAKER MOVABLE CONTACT ARM ARRANGEMENT

Roger N. Castonguay, Terryville; Keith W. Klein, Simsbury; David Arnold, Chester, all of Conn., and Preston L. Ellis, New Holland, Pa., assignors to General Electric Company, New York, N.Y.

Filed Mar. 23, 1989, Ser. No. 327,655

Int. Cl.[5] H01H *33/02*

U.S. Cl. 200—144 R **23 Claims**

1. A molded case circuit breaker contact arm arrangement comprising:

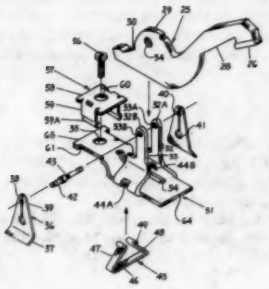
an elongated movable contact arm having a contact attached at one end and a thru-hole arranged through an opposite end;

a support comprising a pair of upstanding support arms extending from a base;

a pivot pin arranged through said support arms and said thru-hole for rotation of said contact arm between closed and open positions;

a first planar shunt plate arranged on one side of said support

arms, said first shunt plate comprising a pair of bifurcated arms extending from a bottom part; and



a U-shaped contact spring arranged over said shunt plate and one of said support arms to hold said first shunt plate in contact with said one support arm.

4,931,604

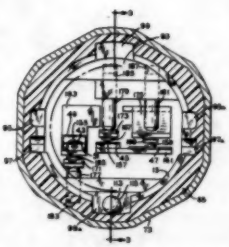
CONTROL DEVICE

Ronald W. Poling, Morrison, Ill., assignor to General Electric Company, Fort Wayne, Ind.

Continuation of Ser. No. 107,448, Oct. 13, 1987, abandoned, which is a division of Ser. No. 932,126, Nov. 18, 1986, Pat. No. 4,703,140. This application Jul. 19, 1988, Ser. No. 221,121

Int. Cl.[5] H01H *35/34*

U.S. Cl. 200—406 27 Claims



2. The device as set forth in claim 1 further comprising caged resilient means engaged between said housing and said force transmitting means for opposing the operation of said force transmitting means.

4,931,605

MULTI-POLE SWITCH

Jon P. Zoller, Prior Lake, Minn., assignor to ITT Corporation, New York, N.Y.

Filed Aug. 7, 1989, Ser. No. 390,141

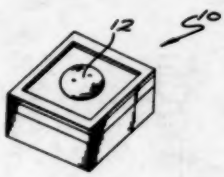
Int. Cl.[5] H01H *5/14*

U.S. Cl. 200—408 15 Claims

1. A switch comprising:

a housing;

a sheet first metal shorting contact having an outer region with first and second end portions, and a first beam having a middle portion and opposite ends whereby said opposite ends are coupled to said first and second portions and said first beam extends in a bowed configuration such that said middle portion lies above an imaginary line connecting said first and second end portions, said first beam having an upwardly bowed main beam portion located between said opposite ends and a pair of fingers extending from said main beam portion, said housing having support surfaces on which said contact outer region rests and a clamp which holds down said contact outer region against said support surfaces;



a pair of switch contacts, each lying under one of said fingers and spaced from the corresponding finger; an actuator first movably mounted at least partially within said housing and having a pair of bosses lying over locations on said first beam, which lie on opposite sides of said first beam middle, said actuator being depressible to depress said first beam locations that lie on opposite sides of said middle to move said fingers against said switch contacts.

4,931,606

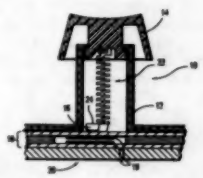
KEY SWITCH MECHANISM AND MEMBRANE ACTUATOR

David A. Bruner, Versailles, Ky., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 28, 1989, Ser. No. 345,068

Int. Cl.[5] H01H *1/10*

U.S. Cl. 200—517 9 Claims



1. A switch activator for closing the contacts of a membrane switch in response to the movement of a switch control member toward said membrane switch, comprising:

a pivotable member having a first and a second surface and a pivot axis extending parallel to said surfaces;

a coiled spring structure extending normal to said first surface and having an axis when said spring structure is in a relaxed state which intersects said pivotable member at a location displaced from said pivot axis;

said coiled spring structure having one end permanently attached to said pivotable member and having a free end formed into a termination means for engaging said switch control member;

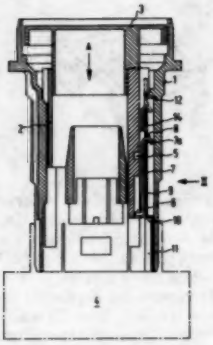
said termination means comprising a first lug extending from said free end and having a pivot surface spaced from a surface of said switch control member around which said termination means pivots, and at least a second lug extending from said free end against which said switch contact member surface engages such that said at least said second lug causes said spring structure to buckle in a predetermined direction when said control member is depressed, said pivot surface extends generally parallel to said pivot axis and generally perpendicular to said axis of said coiled spring structure.

4,931,607

PUSHBUTTON SWITCH

Fritz Berger, Oberbuchsiten, Switzerland, assignor to Elektro-Apparatebau Olten AG, Olten, Switzerland

Filed Jan. 24, 1989, Ser. No. 301,544
Claims priority, application Switzerland, Feb. 4, 1988, 397/88
Int. Cl.[5] H01H 3/42, 13/56
U.S. Cl. 200—524 14 Claims



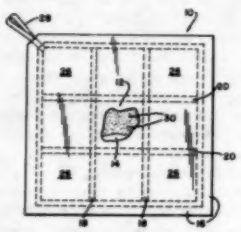
1. A pushbutton switch comprising a housing; a plunger movable in said housing in a predetermined direction between extended and depressed positions; a carrier movable relative to said housing in said predetermined direction between first and second positions; a single cam member; and a follower member arranged to track said cam member, one of said members being provided on said plunger and the other of said members being provided on said carrier, said cam member including an arresting portion which is spaced apart from said follower member during movement of said plunger to depressed position in the first position of said carrier but is engaged by and holds said follower member to thereby hold said plunger against movement to said extended position on movement of said carrier to said second position.

4,931,608

MICROWAVE-HEATABLE HOT PAD

Randolph L. Bills, Riverbank, Calif., assignor to Ran Free, Oakland, Calif.

Filed Dec. 16, 1988, Ser. No. 285,815
Int. Cl.[5] H05B 6/80
U.S. Cl. 219—10.55 F 13 Claims



1. A substantially dry hot pad for absorbing energy in a microwave oven and heating an essentially microwave-transmissive non-comestible article in thermally conductive contact with the pad, comprising:

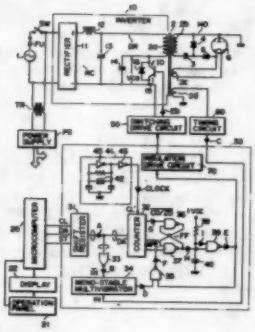
a flexible and conformable substantially dry pad defining a series of individual flexible and conformable closed pockets spaced from each other, each of said pockets being formed of a microwave-transmissive heat-resistive material and at least partially filled with microwave-absorbing particulate matter, said pad being capable of heating an essentially microwave-transmissive non-comestible article in thermally conductive contact therewith in a microwave oven and being flexible and conformable even at room temperature.

4,931,609

HIGH-FREQUENCY HEATING APPARATUS HAVING A DIGITAL-CONTROLLED INVERTER

Masayuki Aoki, Ichinomiya, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed May 26, 1989, Ser. No. 357,722
Claims priority, application Japan, May 30, 1988, 63-132322
Int. Cl.[5] H05B 6/68
U.S. Cl. 219—10.55 B 22 Claims



1. A high frequency heating apparatus comprising:

high frequency radiation generating means for generating high frequency radiation when a high voltage is applied to input terminals thereof; an inverter comprising:

a DC power source for supplying a DC voltage between first and second terminals thereof;

a step-up transformer comprising:

a primary having a first tap connected to the first terminal of the Dc power source and having a second tap; and

a secondary having output terminals connected to the input terminals of the high frequency radiation generating means and having a secondary voltage monitoring output indicative of the voltage on the output terminals;

switching means, having a first current conduction terminal connected to the second tap of the primary of the step-up transformer means, a second current conduction terminal connected to the second terminal of the DC power source, and a current control input, the switching means having a predetermined capacitance between the first current conduction terminal and the second conduction terminal, for causing the current conduction terminals to short or to open depending upon the signal on the current control input; and

inverter-controlling means, having a secondary voltage monitoring input connected to the secondary voltage monitoring output of the step-up transformer, a switching means control output connected to the current control input of the switching means, and a digital ON-time input, for:

causing the switching means to short for an ON period of time, the ON period of time being determined by the digital value of a signal applied to the digital ON-time input, a zero voltage appearing on the secondary voltage monitoring input indicating that a zero voltage

exists across the secondary during the ON period of time;

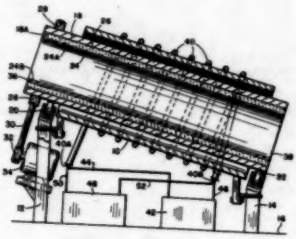
causing the switching means to remain open after the ON period of time until the voltage on the secondary voltage monitoring input again indicates that the voltage on the secondary has reached the zero voltage.

4,931,610

INDUCTION HEATED ROTARY KILN

William L. Hughes, 6118 Greenleaf Ct., Rapid City, S. Dak. 57702, and Harold J. Manning, 9106 Maple Dr., Pasco, Wash. 99301

Filed Jun. 8, 1989, Ser. No. 363,468
Int. Cl.[5] H05B 6/22
U.S. Cl. 219—10.491 **6 Claims**



1. An improved rotary kiln comprising:

an elongated tubular kiln structural member formed of refractory material and supported for rotation;

a tubular liner in said kiln member formed of electrically conductive material;

a stationary tubular structural non-electrically conductive member concentrically surrounding said kiln member and of interior diameter greater than the exterior diameter of said kiln member providing an annular space therebetween;

an induction coil wound on the exterior of said structural member;

means to supply AC electrical energy to said induction coil; and

means of rotating said kiln member.

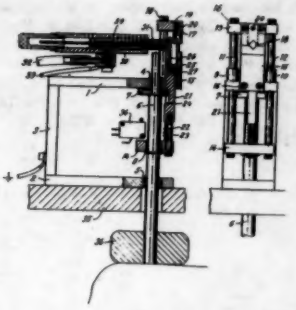
4,931,611

METHOD AND APPARATUS FOR JOINING ELECTRICAL WIRES

Peder U. Poulsen, Huntington Rd., Box 197, Stratford, Conn. 06497

Filed Nov. 4, 1988, Ser. No. 267,271
Int. Cl.[5] B23K 9/00
U.S. Cl. 219—56.22 **5 Claims**

1. A method and apparatus for joining two or more electrical wires utilizing a TIG, (Tungsten Inert Gas) welding process, wherein the wires are gathered into a tight bundle by means of moveable, mechanically operated, electrically conductive jaws, with their ends pointing in the same direction and positioned opposite to and in close proximity from the tungsten electrode and gas nozzle of a TIG welding gun, and an arc struck between the electrode and wire ends, the arc being maintained for a period sufficient to form a ball of molten metal



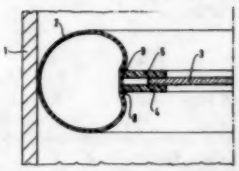
which, upon solidification, establishes a strong electrical connection between the wires in the bundle.

4,931,612

DEVICE FOR FORMING A CLOSED CHAMBER INSIDE TWO METAL PIPES TO BE CONNECTED TOGETHER BY ARC WELDING UNDER A PROTECTIVE GAS

Paul Belleride, Montigny en Gohelle, and Maurice Duhamel, Toufflers, both of France, assignors to Societe Anonyme dite : Stein Industrie, Velizy-Villacoublay, France

Filed Mar. 30, 1989, Ser. No. 330,579
Int. Cl.[5] B23K 9/32
U.S. Cl. 219—60 R **8 Claims**



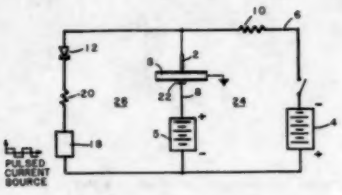
1. A device for forming a closed chamber inside a set of two metal pieces of pipework (1) to be interconnected by arc welding under a protective gas, the device comprising a first hollow element made of elastomer disposed inside the first piece of pipework and a second hollow element made of elastomer disposed inside the second piece of pipework, both hollow elements being inflatable to close the corresponding piece of pipework,

the device being characterized in that each of the hollow elastomer elements comprises a toroidal inflatable tube (2) having a disk (3) with a disk periphery glued to the internal equatorial meridian thereof, said disk withstanding the pressure difference between the ambient atmosphere and the desired internal pressure inside the closed chamber, said disk being of a thickness less than the diameter of the inflatable tube and being of a proper diameter in relation to the inner diameter of the toroid made up by the inflatable tube to cause the zone of the tube adjacent to said internal equatorial meridian when inflated to be concave about the periphery of the disk.

4,931,613
ELECTRICAL DISCHARGE SCRIBING FOR IMPROVING CORE LOSS OF GRAIN-ORIENTED SILICON STEEL

James A. Salsgiver, Sarver; Eugene W. Bartel, Robinson Township, Allegheny County, and Rowland C. Rudolf, III, Ben Avon, all of Pa., assignors to Allegheny Ludlum Corporation, Pittsburgh, Pa.

Division of Ser. No. 47,967, May 8, 1987, Pat. No. 4,767,469.
This application Mar. 18, 1988, Ser. No. 169,684
Int. Cl.[5] H01F *1/04*; B23K *9/00*
U.S. Cl. 219—68 **10 Claims**



1. The apparatus for scribing insulation coated grain-oriented steel sheet or strip to improve core loss and magnetic permeability, said apparatus comprising:

an electric discharge electrode adapted to contact the insulated surface of grain-oriented silicon steel and to be moved along the steel surface in a direction substantially transverse to the direction of rolling the steel into sheet or strip while maintaining contact therewith;

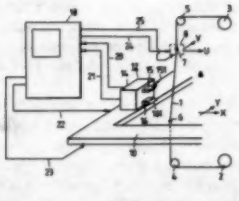
means for providing a differential potential at the electrode from a high voltage-low current source followed by a low voltage-high current source, said high voltage-low current source providing between 200 to 1000 volts to break down the insulation coating so then the low voltage-high current source can work the steel surface; and

means for producing a plurality of electrical discharges between the moving electrode and the insulated steel to form a plurality of generally aligned indentations across the steel surface.

4,931,614
WIRE ELECTRODE VERTICALLY SETTING METHOD AND DEVICE FOR WIRE CUT ELECTRIC DISCHARGE MACHINE

Mitsutaka Sumita, Aichi, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed May 30, 1989, Ser. No. 358,051
Claims priority, application Japan, May 31, 1988, 63-131661
Int. Cl.[5] B23H *7/10*
U.S. Cl. 219—69.12 **10 Claims**



1. A method of setting a wire electrode for a wire cut electric discharge machine perpendicular to a reference surface of a machining table, the method comprising the steps of:

moving said machining table on which is a wire electrode perpendicularity detecting means including at least one pair of upper and lower contact members provided;

detecting that both of said upper and lower contact member are brought into contact with said wire electrode simultaneously;

sampling an occurrence of contact of at least one of said upper and lower contact members with said wire electrode for a predetermined period of time at each a predetermined interval;

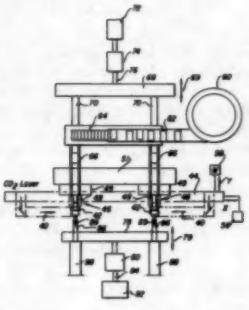
determining attitude of said wire electrode according to a total number of times of contact of one of said upper and lower contact members with said wire electrode and a ratio of a number of times of contact of only said upper contact member with said wire electrode to a number of times of contact of only said lower contact member with said wire electrode; and

setting the wire electrode perpendicular to the reference surface in response to a result of the determination.

4,931,615
APPARATUS FOR MACHINING INTRICATE FEATURE CUTS IN THIN WALLED TUBULAR PARTS

Donald G. Muncy, Wilmington, N.C., and William B. Plotts, Marlow, N.H., assignors to General Electric Company, San Jose, Calif.

Filed Dec. 2, 1988, Ser. No. 279,007
Int. Cl.[5] B23K *26/00*
U.S. Cl. 219—121.67 **18 Claims**



1. Apparatus for machining feature cuts in the sidewalls of a succession of tubular parts, each having a bore, said apparatus comprising, in combination:

A. a laser including a focussing head for directing a cutting beam at a machining site;

B. a rotary positioner for holding a part in a predetermined machining position at said machining site;

C. means for delivering parts successively to said positioner;

D. a first motor for rotating said positioner and a part held thereby through a programmed series of angular motions about the part axis;

E. a second motor for producing a programmed series of relative motions between said cutting beam and the part along a first axis parallel to the part axis; and

F. a third motor for producing a programmed series of relative motions between said cutting beam and the part along a second axis normal to the part axis;

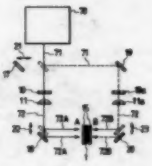
G. whereby upon controlled activations of said motors, said cutting beam is scanned over the surface of the part sidewall in programmed patterns to machine predetermined feature cuts therein.

4,931,616

METHOD FOR REMOVING INSULATING COATING OF ELECTRIC CABLE AND APPARATUS THEREFOR

Akaru Usui, and Hiroshi Tsukahara, both of Aichi, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 12, 1989, Ser. No. 296,106
Claims priority, application Japan, Jan. 25, 1988, 63-14101; Aug. 5, 1988, 63-195639
Int. Cl.[5] B23K *26/00*
U.S. Cl. 219—121.68 19 Claims



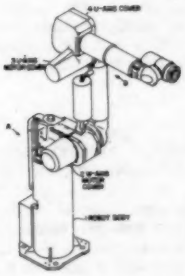
1. A method of removing insuleting coating of an electric cable, comprising the step of irradiating said electric cable with a laser beam pulse having a small pulse width and a large peak output, wherein said pulse width is 1 to 2 μsec and said peak output is 15 MW.

4,931,617

ELECTRICALLY CONDUCTIVE COATING FOR COVER OF INDUSTRIAL ROBOT

Kenichi Toyoda, Hino; Nobutoshi Torii, Hachioji; Hitoshi Mizuno, and Masanao Miyawaki, both of Minamitsuru, all of Japan, assignors to Fanuc Ltd., Minimatsuru, Japan

PCT No. PCT/JP88/00583, § 371 Date Feb. 2, 1989, § 102(e) Date Feb. 2, 1989, PCT Pub. No. WO88/10179, PCT Pub. Date Dec. 29, 1988
PCT Filed Jun. 14, 1988, Ser. No. 313,970
Claims priority, application Japan, Jun. 24, 1987, 62-157301
Int. Cl.[5] B23K *9/32*
U.S. Cl. 219—125.1 7 Claims



1. An industrial robot for use in TIG arc welding, or the like, wherein high voltage produces high frequency noise, comprising:

a robot body having a ground level potential;

a plastic cover for an electrical component and for signal lines connected to the electrical component;

an electrically conductive coating on said plastic cover; and

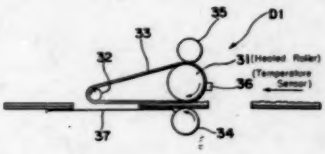
screw means for electrically connecting the coating directly to the robot body, said coating having a reduced potential level equivalent to the ground level and shielding said signal lines located inside the cover from the high frequency noise generated outside the robot body during welding.

4,931,618

IMAGE GLAZING DEVICE

Syoichi Nagata, Yamatokoriyama, and Kunio Okashi, Nara, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Dec. 13, 1988, Ser. No. 283,839
Claims priority, application Japan, Dec. 18, 1987, 62-321992; Dec. 18, 1987, 62-321993
Int. Cl.[5] G03G *15/20*
U.S. Cl. 219—216 3 Claims



1. An image glazing device, for use in an image forming apparatus, for applying a gloss to an image formed on an image receiving material, said device comprising:

at least two rollers disposed subsequent to development of an image on an image receiving material;

an image glazing member passed around and rotatably driven by said two rollers for applying a gloss to said image;

a heating means associated with an upstream one of said two rollers for heating said image glazing member; and

a paper transport means juxtapositioned to said image glazing member for transporting said image receiving material,

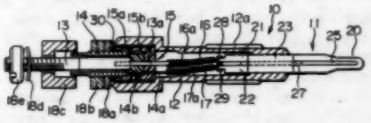
wherein a diameter of a downstream one of said two rollers is determined in accordance with a rotating speed of said image glazing member and a temperature of said image glazing member at a location where said downstream roller is provided so that image offsetting does not take place.

4,931,619

GLOW PLUG FOR DIESEL ENGINES

Yasunobu Ogata; Koichiro Kurihara, both of Kumagaya; Mitsuke Masaka, Kawagoe, and Kouji Hatanaka, Saitama, all of Japan, assignors to Hitachi Metals, Ltd. and Jidosha Kiki Co., Ltd., both of Tokyo, Japan

Filed May 27, 1988, Ser. No. 199,629
Claims priority, application Japan, May 29, 1987, 62-133684; May 29, 1987, 62-133685; May 29, 1987, 62-133686; May 29, 1987, 62-133687; May 29, 1987, 62-133688
Int. Cl.[5] F23Q *7/22*
U.S. Cl. 219—270 20 Claims



1. A glow plug for diesel engines comprising a ceramic heater supported, with one end thereof cantilevered toward the outside, by the tip of a hollow holder; said ceramic heater is composed of a U-shaped heating portion and a pair of leads extending backwards from both ends of said U-shaped heating portion, both being formed integrally by an electrically conductive sintered sialon, which is formed by adding a small amount of Al_2O_3 to a raw meal containing Si_3N_4 as a principal ingredient, a small amount of AlN polytype and 5 wt. % or less

of Y_2O_3, and mixing the addition product with 23–70 vol. % of at least one type of Ti carbide, nitride and carbide-nitride; an electrically insulating layer is provided on the outer periphery of at least one of said leads and bonded to, and held by, the inside of said holder; and the rear end of at least one of said leads is connected by means of a metallic lead wire to an external connection terminal held in an insulated state at the lead end of said holder.

4,931,620

ELECTRIC HOTPLATE

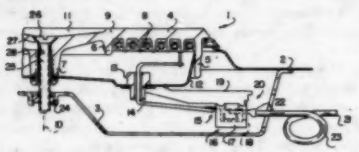
Robert Kichcrer, and Felix Schreder, both of Oberderdingen, Fed. Rep. of Germany, assignors to E.G.O. Elektro-Gerate Blanc u. Fischer, Fed. Rep. of Germany

Filed Aug. 31, 1988, Ser. No. 239,136

Claims priority, application Fed. Rep. of Germany, Sep. 5, 1987, 8712088[U]

Int. Cl.[5] H05B 3/70

U.S. Cl. 219—463 21 Claims



20. An electric hotplate, comprising:

a hotplate body including means for mounting the hotplate body in a mounting plate by insertion from a plate top in the vicinity of a plate opening, said hotplate body having a cooking surface on a top side, an underside, and an outer circumference, the hotplate body defining a central axis;

at least one heating resistor for said hotplate body, and terminals for electrically connecting said at least one heating resistor to mating terminals of supply lines, said terminals projecting in the vicinity of said underside of the hotplate body and being provided with at least one electrical connecting piece of an electrical coupling means operable from said top of said mounting plate;

a central stud provided in the center of the hotplate body and projecting from said underside, said central stud having a bore for receiving a fastening bolt for locking the hotplate with respect to said mounting plate, said bore being constructed as a throughbore passing through the central stud and provided to receive said fastening bolt with a bolt head of said fastening bolt being countersunk with respect to the cooking surface and operable from the cooking surface, and wherein a mating plug for said terminals is fixed below said plate top on an underside of said mounting plate, means being provided for connecting said mating plug to said supply lines upon insertion of the hotplate into said plate opening of said mounting plate by way of an automatic plugging engagement with the mating plug, said terminals projecting substantially radially with respect to said central axis toward said outer circumference.

4,931,621

ELECTRIC HEATER

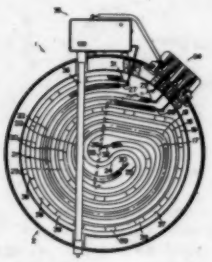
Gerhard Goessler, Oberderdingen, Fed. Rep. of Germany, assignor to E.G.O. Elektro-Gerate Blanc u. Fischer, Fed. Rep. of Germany

Filed Aug. 11, 1988, Ser. No. 231,132

Claims priority, application Fed. Rep. of Germany, Aug. 18, 1987, 8711209[U]

Int. Cl.[5] H05B 3/74

U.S. Cl. 219—467 29 Claims



1. An electric heater, comprising:

a carrier having a front;

a number of elongated heating resistors, including a first heating resistor and at least one non-first additional heating resistor, arranged in spirals defining nested spiral turns on said front of the carrier, said heating resistors being switchable in a higher number of power stages than corresponds to their number, at least one said first heating resistor being defined by a spiral strand only entirely operable; and,

a heating field defined by said heating resistors, wherein said at least one first heating resistor forms at least a double spiral with at least two spirals operable only commonly, a first spiral of said at least two spirals forming at least one first spiral turn and a second spiral of said at least two spirals forming at least one second spiral turn, at least two said first and second spiral turns of said first heating resistor being located laterally adjacent to one another, at least one spiral turn of at least one said non-first additional heating resistor engaging between said first and second spiral turns.

4,931,622

ELECTRONIC CARD RECEIVING DEVICE AND EJECTION MECHANISM

Tomonari Ohtsuki; Takakatsu Inoue, both of Mooka, and Yoshiaki Tanaka, Kitakatsushika, all of Japan, assignors to Daiichi Denshi Kogyo Kabushiki Kaisha, Japan

Filed Aug. 4, 1986, Ser. No. 893,031

Claims priority, application Japan, Aug. 9, 1985, 60-175405; Aug. 24, 1985, 60-128971

Int. Cl.[5] G06K 7/01, 13/08

U.S. Cl. 235—487 10 Claims

1. An electronic card receiving device for accepting an electronic card having a plurality of contacts thereon and ejecting the card upon a given signal comprising:

card holder means forming a card receiving space in the device for receiving an electronic card;

card anchoring means for anchoring and holding said electronic card in position in said card receiving space;

movable contact means for electrically connecting the device to said contacts of said electronic card;

means for moving said movable contact means into engagement with said contacts of said electronic card;

card pushing means for disconnecting the device from the electronic card and ejected it out of the device, said card pushing means including means for activating said card pushing means, said means for activating including a solenoid in operable communication with a wire secured to a stopper, said stopper being biased by a coil spring in a direction opposite to the direction said solenoid moves said wire, means for retracting said movable contact means from engagement with said contacts of said electronic card, said means for retracting including a first spring in operable communication with a first reject plate, having an abutting portion thereof, to spring bias said first reject plate in a desired direction, said first reject plate being held against the force of said first spring by said stopper, a latch plate having a guide portion including a reference surface at a front end thereof and an oblique surface for contact with said abutting portion, means for ejecting said card from said device, said means for ejecting including a second spring in operable communication with a second reject plate, having a reject arm for contact with said electronic card, to move said second reject plate in a desired direction so that upon activation of said solenoid said stopper is moved by said wire against the force of said coil spring to release said first reject plate, said first spring moves said abutting surface to contact said oblique surface to move said latch plate thereby releasing said second reject plate to allow said second spring to move said reject plate and eject said electronic card out of said device with said reject arm.

4,931,623

PORTABLE STORAGE MEDIUM

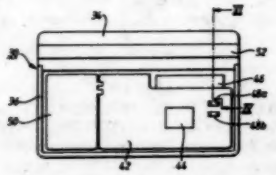
Koichiro Nakamura, and Yoshinori Tanaka, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Tokyo, Japan

Filed Nov. 9, 1988, Ser. No. 268,856

Claims priority, application Japan, Nov. 14, 1987, 62-286477; Dec. 29, 1987, 62-335031

Int. Cl.[5] G06K *19/02*

U.S. Cl. 235—488 **13 Claims**



1. A portable storage medium including an electronic component therein, comprising:

card-shape housing means for housing the electronic component, including metallic means substantially surrounding the component for withstanding substantial external forces, and means having a greater flexibility than the metallic means attached to the metallic means for cushioning a portion of the housing means against external forces; and

magnetic stripe means flexibly supported on the housing means for deforming a limited amount under the application of external forces to the stripe in response to the flexibility of the cushioning means.

4,931,624

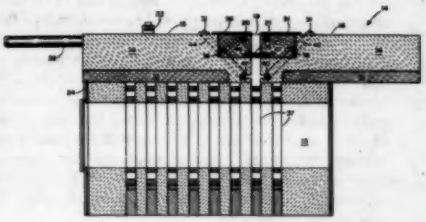
THERMAL DISTORTION FREE VIEWING OF A HEATED CAVITY

Robert H. Mellen, Sr., P.O. Box 535, New London, N.H. 03257

Division of Ser. No. 71,771, Jul. 10, 1987. This application Apr. 17, 1989, Ser. No. 340,125

Int. Cl.[5] H05B *1/02*

U.S. Cl. 219—497 **5 Claims**



1. Furnace apparatus for monocrystal growth comprising:

a. a dynamic gradient furnace having a cavity surrounded by a wall;

b. a longitudinally movable viewing assembly in said wall having a viewport;

c. an imaging system connected to said viewport for obtaining images of a work product in said cavity;

d. an image storage device for storing sample images of a work product;

e. a comparator connected to said imaging system and to said image storage device for comparing sample images with images from said imaging system;

f. a controller connected to said comparator and to temperature sensors and heating elements in said furnace for controlling temperature gradients in said furnace; and,

g. a motor connected to said controller and to said viewing assembly for moving said viewing assembly in synchronism with moving temperature gradients, whereby the interface shape of a crystal growing in said furnace may be compared with a desired shape and the furnace controlled to obtain the desired shape.

4,931,625

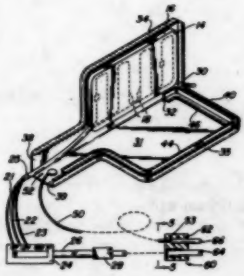
DEVICE FOR SHIELDING ELECTROMAGNETIC RADIATION

Edward J. Marlinski, 526 W. 2nd St., Lansdale, Pa. 19446

Filed Aug. 17, 1988, Ser. No. 232,948

Int. Cl.[5] H05B *3/34*

U.S. Cl. 219—528 **11 Claims**



1. A device for shielding an electrically powered heating means having a resistive heating unit and power supply input

wires so as to block and contain the electromagnetic radiation emitted thereby comprizing:

cover means including an external non-conductive backing and an internal electrically conductive layer constructed and arranged to enclose the resistive heating unit of the heating means fastened shut with a non-conductive closure, and

detachable ground means for electrically connecting said internal electrically conductive layer of said cover means to ground, said detachable ground means includes a flexible grounding wire and a corrosion resistant metallic snap type fastener for convenient and repetitive detachment and reattachment of said ground means whereby one portion of the metallic snap type fastener is affixed to one end of said flexible grounding wire and the other portion of the fastener is affixed to said internal electrically conductive layer of the device so positioned that when said cover means is closed in a folded overlying relationship the metallic snap type fastener is contained within said non-conductive backing.

4,931,626

PIC THERMISTOR DEVICE HAVING HEAT RADIATION FINS WITH ADJUSTABLE TEMPERATURE REGULATING GUIDE PLATES

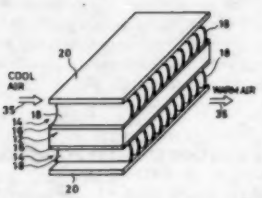
Takashi Shikama; Asami Wakabayashi, and Kiyofumi Torii, all of Nagaokakyo, Japan, assignors to Murata Manufacturing Co., Ltd., Japan

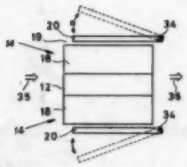
Filed Mar. 10, 1989, Ser. No. 322,909

Claims priority, application Japan, Mar. 10, 1988, 63-57237

Int. Cl.[5] H05B *3/00*; H01C *7/02*; F28F *3/02, 27/00*

U.S. Cl. 219—540 **5 Claims**





1. A PTC thermistor device, comprising:

a PTC thermistor unit;

a heat radiation member including a plate thermally coupled to said PTC thermistor unit and a number of fins formed on the plate, free ends of said fins forming opening portions therebetween; and

a guide plate disposed so as to cover said opening portions and being moveable relative to the free ends of said fins, whereby an opening degree of said opening portions can be changed.

4,931,627

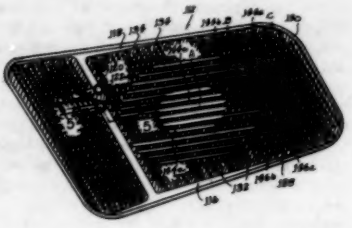
POSITIVE TEMPERATURE COEFFICIENT HEATER WITH DISTRIBUTED HEATING CAPABILITY

Leslie M. Watts, Elmhurst, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Continuation-in-part of Ser. No. 233,271, Aug. 16, 1988, Pat. No. 4,857,711. This application Jul. 13, 1989, Ser. No. 379,276

Int. Cl.[5] H05B *1/00*

U.S. Cl. 219—548 **13 Claims**



1. A heating device comprising:

a planar electrically insulated substrate;

an electrical buss system on one surface of said substrate, including a pair of buss bars and two electrode patterns having a plurality of spaced apart parallel interdigitated electrodes, adjacent electrodes of said plurality of interdigitated electrodes connected to different ones of said pair of buss bars, each buss bar extending from one of a pair of terminal connection points along generally opposite portions of a peripheral edge of said substrate;

a plurality of heater-lets formed of an electrically resistive layer of material having a positive temperature coefficient, said plurality of heater-lets having varying sizes and shapes being deposited over said electrical buss system between adjacent electrodes of said interdigitated electrodes. each of said plurality of heater-lets being separated from its neighbor by spaces of varying sizes and shapes so as to form a plurality of individual heating areas of variable intensity; and

at least one adhesive layer being deposited over said electrically resistive layer including the spaces between said heater-lets, said adhesive layer contacting and bonding directly to said substrate in areas of said substrate between said heater-lets,

whereby the power distribution over the entire substrate is selectively regulated by varying the density of the heater-lets.

4,931,628

APPARATUS FOR REPRODUCING OPTICAL CARD DATA WITHOUT POSITION INDICATORS

Takuya Wada, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan

PCT No. PCT/JP86/00558, § 371 Date Jul. 17, 1987, § 102(e) Date Jul. 17, 1987, PCT Pub. No. WO87/03131, PCT Pub. Date May 21, 1987

PCT Filed Nov. 5, 1986, Ser. No. 86,628

Claims priority, application Japan, Nov. 18, 1985, 60-256512; Sep. 8, 1986, 61-160588

Int. Cl.[5] G06K *7/10*; G11B *7/12*

U.S. Cl. 235—454 **30 Claims**

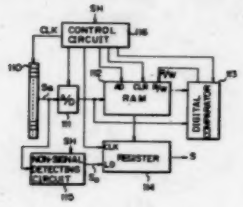
1. An optical card reproducing apparatus characterized by comprising:

an optical card in which data is recorded as a plurality of tracks on an optical recording medium;

reproducing means having a detector for reproducing said data by detecting data signals corresponding to the reflected light of the irradiated light from a light source by said optical recording medium along plural scanning lines

traversing the area of said card on which said tracks are located;

clock generating means for supplying a sampling clock to said detector; and



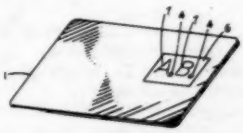
period setting means connected to said detector responsive to said data signals detected in adjacent scanning lines for setting a period during each of said scanning lines for which said reproducing means reproduces the data recorded on one track in response to signals from among said scanning lines.

4,931,629

SECURITY CREDIT CARD

Robert Frankfurt, 498 Kenaston Ave. T.M.R., Quebec, Canada H3R-1M9

Filed Jun. 21, 1988, Ser. No. 209,685
Claims priority, application Canada, Apr. 29, 1988, 565585
Int. Cl.[5] G06K *19/02*
U.S. Cl. 235—488 **15 Claims**



1. A credit card comprising a plastic base layer and one or more distinctive gems retained thereby.

4,931,630

APPARATUS AND METHOD FOR AUTOMATICALLY FOCUSING AN INTERFERENCE MICROSCOPE

Donald K. Cohen; James D. Ayres, and Eugene R. Cochran, all of Tucson, Ariz., assignors to Wyko Corporation, Tucson, Ariz.

Filed Apr. 4, 1989, Ser. No. 333,182
Int. Cl.[5] G01J *1/20*; G02B *27/42*
U.S. Cl. 250—201.3 **23 Claims**

1. A method of automatically focusing an interference microscope onto a sample surface, comprising the steps of:

(a) rapidly moving an objective of the interference microscope to a memory lock position between the sample surface and a fringe window;

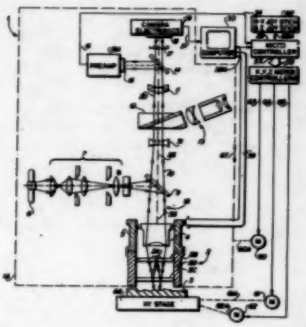
(b) moving the objective away from the sample surface;

(c) illuminating the sample surface with broad band light through an interferometer of the interference microscope, splitting off a part of a resulting interference beam, and sensing intensities of the split off part of the interference beam by means of a first detector;

(d) stopping movement of the objective in response to sensing of a variation in the sensed intensities indicating presence of fringes in the interference beam;

(e) moving the objective slowly in the fringe window, sensing and recording intensities of signals being produced by the first detector, and determining and storing a maximum intensity;

(f) moving the objective very slowly in the fringe window, sensing intensities of signals being produced by the first detector, and comparing them to the stored maximum intensity;



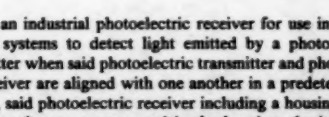
(g) stopping the objective in response to the comparing when an intensity being produced by the first detector is equal to a preselected percentage of the maximum intensity.

4,931,631

LONG RANGE, THRU-BEAM PHOTOELECTRIC ALIGNMENT INDICATOR

Robert J. Jackson, Bothell, Wash., assignor to Opcon Incorporated, Everett, Wash.

Continuation-in-part of Ser. No. 95,639, Sep. 14, 1987, abandoned. This application Jul. 1, 1988, Ser. No. 214,379
Int. Cl.[5] G01V *9/04*
U.S. Cl. 250—221 **4 Claims**



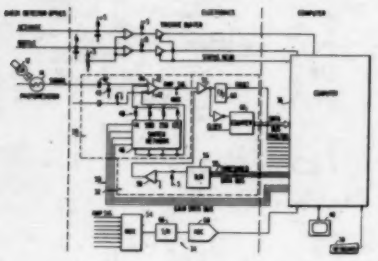
1. In an industrial photoelectric receiver for use in photosensing systems to detect light emitted by a photoelectric transmitter when said photoelectric transmitter and photoelectric receiver are aligned with one another in a predetermined manner, said photoelectric receiver including a housing and a light detecting means mounted in the housing, the improvement comprising an alignment indicator, said alignment indicator including an indicator mounted in said receiver housing and emitting visible light from the side of said receiver housing facing said transmitter when said receiver is aligned with a transmitter such that the light emitted by a light source mounted in said transmitter is detected by said light detecting means mounted in said receiver housing, said indicator including a collimating lens located in said side of said receiver facing said transmitter and a light emitting element mounted in said housing behind said collimating lens such that light emitted by said light emitting element passes through said collimating lens.

4,931,632

VARIABLE PARAMETER OPTICAL BOTTLE CHECKER

Thomas L. Brandt, Windsor, N.Y., assignor to Brandt Manufacturing Systems, Inc., Deposit, N.Y.

Filed Oct. 7, 1988, Ser. No. 254,640
Int. Cl.[5] G01N 9/04
U.S. Cl. 250—223 B 15 Claims



1. A testing apparatus for checking defects in an article, comprising:

a source of radiation for irradiating an article;

means for moving said article at a predetermined velocity relative to said radiation source;

at least one photosensor for receiving light which was emitted from said radiation source and which has interacted with said moving article;

a variable gain amplifier receiving an output of said photosensor;

a comparator for comparing an output of said variable gain amplifier with a threshold value and thereby producing a comparator output;

a clocked counting circuit receiving an output of said comparator for counting a time said comparator produces a predetermined value of said comparator output; and

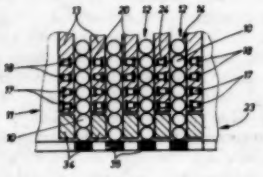
first means for determining when said counting circuit has counted a value falling between a preset minimum value and a preset maximum value, said determining means thereby providing a reject signal for said article.

4,931,633

PACKAGING MACHINE FOR CIGARETTES WITH SHAFT WALL MOUNTED SENSORS

Heinz Focke, and Kurt Liedtke, both of Verden, Fed. Rep. of Germany, assignors to Focke & Co. GmbH & Co., Verden, Fed. Rep. of Germany

Filed Nov. 24, 1987, Ser. No. 124,517
Claims priority, application Fed. Rep. of Germany, Nov. 27, 1986, 3640491
Int. Cl.[5] G01N 9/04
U.S. Cl. 250—223 R 14 Claims



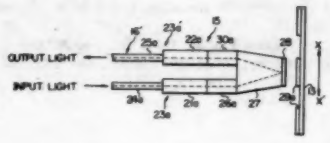
1. Magazine for stocking cigarettes in a cigarette-packaging machine, the magazine being subdivided, at least in a lower region thereof, by shaft walls into magazine shafts each for receiving a vertical row of cigarettes, said magazine comprising test members for testing the cigarettes for a correct tobacco content and presence of a filter; wherein said test members comprise optoelectrical sensors (17, 18; 30, 31) located in said shaft walls (13) of the magazine (11), said shaft walls (13) having a thickness sufficiently large to accommodate said sensors.

4,931,634

OPTICAL POSITION SENSOR USING KERR EFFECT AND A MAGNETIC SCALE

Kiyoshi Toyama, Gifu, Japan, assignor to Teijin Seiki Company Limited, Osaka, Japan

Filed Nov. 21, 1988, Ser. No. 274,286
Claims priority, application Japan, Dec. 28, 1987, 62-335333; Feb. 8, 1988, 63-28381
Int. Cl.[5] G02F 1/01; G01D 5/34; G01B 7/14
U.S. Cl. 250—225 3 Claims



1. An optical position sensor for use on aircraft comprising:

light emitting means for emitting light;

an optical block having a Kerr effect type magneto-optical effect element mounted thereon;

a movable magnetic scale disposed in opposed relationship to said magneto-optical effect element and having a plurality of magnetized segments mounted thereon;

first optical wave guiding means connected at its one end to said light emitting means, the first optical wave guiding means being adapted for guiding said light emitted from said light emitting means;

polarizing means connected at its one end directly to the other end of said first optical wave guiding means and at its other end directly to one end of said optical block, the polarizing means being adapted to convert said light into light having a single plane of polarization, the single plane of polarization being rotated to a predetermined angle by said magneto-optical effect element in the presence of said magnetized segments;

polarization detecting means connected at its one end directly to the other end of said optical block, the polarization detecting means being adapted to pass therethrough light wherein the single plane of polarization is rotated to said predetermined angle;

second optical wave guiding means connected at its one end directly to the other end of said polarization detecting means, the second optical wave guiding means being adapted for guiding said light from said polarization detecting means; and

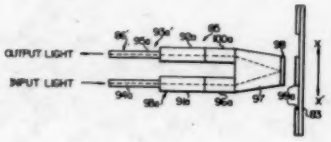
opto-electric converting means connected to the other end of said second optical wave guiding means, the opto-electric converting means being adapted for converting said light guided by said second optical wave guiding means into an electrical signal.

4,931,635

OPTICAL POSITION SENSOR USING FARADAY EFFECT ELEMENT AND MAGNETIC SCALE

Kiyoshi Toyama, Gifu, Japan, assignor to Teijin Seiki Company Limited, Osaka, Japan

Filed Nov. 15, 1988, Ser. No. 271,431
Claims priority, application Japan, Dec. 1, 1987, 62-303813; Mar. 4, 1988, 63-51824
Int. Cl.[5] G02F *1/01*; G01D *5/34*; G01B *7/14*
U.S. Cl. 250—225 **3 Claims**



1. An optical position sensor for use on an aircraft comprising:

light emitting means for emitting light;

first optical wave guiding means connected at its one end to said light emitting means and adapted for guiding said light emitted from said light emitting means;

polarizing means connected at its one end directly to the other end of said first optical wave guiding means and adapted to convert said light into light having a unitary plane of polarization;

a Faraday effect element connected at its one end directly to the other end of said polarizing means and having reflecting means at its other end;

a movable magnetic scale disposed in opposed relationship to said reflecting means and having a plurality of magnetized segments mounted thereon, the unitary plane of polarization being optically rotated in accordance with the arrangement of said magnetized segments;

polarization detecting means connected at its one end directly to the other end of said Faraday effect element and adapted to pass therethrough light wherein the plane of polarization thereof is not optically rotated;

second optical wave guiding means connected at its one end directly to the other end of said polarization detecting means and adapted for guiding said light from said polarization detecting means; and

opto-electric converting means connected to the other end of said second optical wave guiding means and adapted for converting said light guided by said second optical wave guiding means into an electric signal.

4,931,636

TWO WAVELENGTH OPTICAL SENSOR AND SENSING SYSTEM

Raymond W. Huggins, Mercer Island, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Aug. 26, 1988, Ser. No. 237,307
Int. Cl.[5] G01J *3/50*
U.S. Cl. 250—226 **18 Claims**

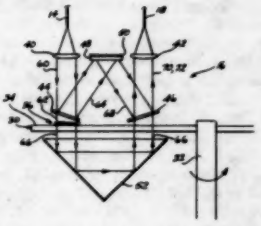
1. A sensor for use in a two-wavelength, referenced optical sensing system, for determining a value of a measurand, the sensor comprising:

wavelength sensitive beamsplitting means for receiving an optical input signal having first and second wavelength bands, and for forming therefrom first and second beams, the first beam containing a major portion of the optical input signal in the first wavelength band, and the second beam containing a major portion of the optical input signal in the second wavelength band;

an encoder, the encoder including means for modulating the intensity of light by an amount that varies as the value of the measurand varies;

wavelength sensitive modulation means for preferentially modulating the intensity of light in the first wavelength band in comparison to light in the second wavelength band; and

optical path means for forming signal and reference paths for



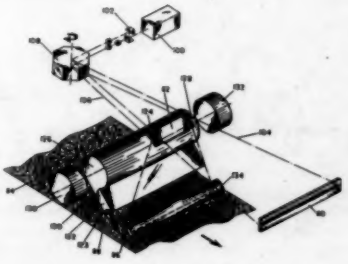
the respective first and second beams such that the first beam is modulated by the encoder to form a modulated first beam, and such that the second beam is modulated by the wavelength sensitive modulation means to form a modulated second beam, whereby the relative intensity of the modulated first beam with respect to the modulated second beam provides a measure of the value of the measurand.

4,931,637

SCANNER UTILIZING A PARTICULAR LIGHT GUIDE

Shmuel Succari, Raanana; Shalev Gilad, Hod HaSharon; Michael Nagler, Tel Aviv; Avigdor Belber, Raanana, and Dov Berman, Hofit, all of Israel, assignors to Scitex Corporation Ltd., Herzlia Bet, Israel

Continuation of Ser. No. 103,218, Oct. 1, 1987, abandoned. This application Aug. 21, 1989, Ser. No. 396,805
Claims priority, application Israel, Oct. 7, 1986, 80242
Int. Cl.[5] G02B *26/10*; H04N *1/10*
U.S. Cl. 250—235 **10 Claims**



6. Apparatus for receiving light reflected from a surface to be scanned and comprising a light guide arranged in light receiving relationship with the surface to be scanned alongside the scan line at one side thereof and a cylindrical mirror arranged in light receiving relationship with the surface to be scanned alongside the scan line at an opposite side thereof for reflecting light received from the surface into the light guide, said light guide comprising a generally planar portion having a concave curved edge facing the scan line, said generally planar portion terminating in a generally circular cylindrical light pipe having axial butt ends, and photodetectors associated in light receiving relationship with said axial butt ends.

4,931,638

METHOD OF MONITORING HIDDEN COAL-ROCK INTERFACE AND TRANSDUCER REALIZING THIS METHOD

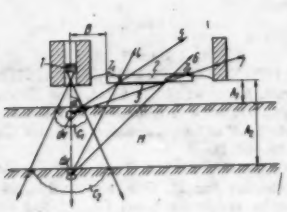
Zinovy A. Chernyak, Leninsky prospekt, 36, kv. 152, Moscow; Alexandr A. Tsvetkov, poselok Tomilino, ulitsa Gogolya, 30, kv. 74, Moskovskaya oblast; Alexandr M. Onischenko, Ljibertsy Oktyabrsky prospekt, 384/2, kv. 17, Moskovskaya oblast; Anatoly I. Kandala, Ljibertsy, Oktyabrsky prospekt, 380/zh, kv. 33, Moskovskaya oblast; Valery G. Khrapov, Ljubertsy, Oktyabrsky prospekt, 170/7, kv. 30, Moskovskaya oblast; Georgy M. Nunuparov, Ljubertsy, Oktyabrsky prospekt, 380e, kv. 45, Moskovskaya oblast; Vladimir M. Slavinsky, Ljubertsy, Komsomolsky prospekt, 9, kv. 92, Moskovskaya oblast; Isaak L. Geikhman, ulitsa Velyaminovskaya, 6, korpus 1, kv. 302, Moscow; Nikolai P. Omelchenko, Shkolny bulvar, 13, kv. 35, Donetsk; Boris A. Rafalovich, poselok Tomilino, ulitsa Gogolya, 13, kv. 9, Moskovskaya oblast; Viktor I. Silaev, ulitsa Krasnoflotskaya, 100b, kv. 101, and Konstantin F. Zhdanov, ulitsa Artema, 58, kv. 9, both of Donetsk, all of U.S.S.R.

PCT No. PCT/SU86/00121, § 371 Date Jul. 25, 1988, § 102(e) Date Jul. 25, 1988, PCT Pub. No. WO88/05116, PCT Pub. Date Jul. 14, 1988

PCT Filed Dec. 25, 1986, Ser. No. 265,807

Int. Cl.[5] G01T *5/00*

U.S. Cl. 250—253 9 Claims



1. A method of monitoring a hidden coal-rock interface, comprising the steps of irradiating the medium being monitored from a gamma-ray source, registering backward scattered radiation by a detector, and determining the hidden coal-rock interface from the intensity of the backward scattered radiation, characterized in that backward scattered radiation is registered at a distance from the surface of the medium being monitored and at a distacne from the gamma-ray source, which does not exceed a preset maximum distance from the detector to the medium, while two zones of reception of backward scattered radiation are formed at the detector, differently spaced from the radiation source, so that the intensity of the backward scattered radiation received by the zone closest to the radiation source diminishes with the distance to the detector to the medium, whereas the intensity of backward scattered radiation received by the zone far from the radiation source increases, in which case the intensities of backward scattered radiation received by both zones are summed up to obtain the total intensity of backward scattered radiation invariant with respect to the varying distacne from the detector to the medium.

4,931,639

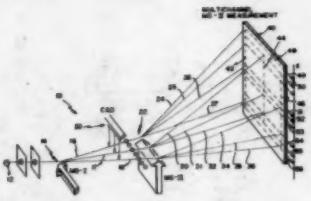
MULTIPLICATION MEASUREMENT OF ION MASS SPECTRA

Fred W. McLafferty, Ithaca, N.Y., assignor to Cornell Research Foundation, Inc., Ithaca, N.Y.

Continuation of Ser. No. 239,423, Sep. 1, 1988, abandoned. This application Sep. 8, 1988, Ser. No. 241,869

Int. Cl.[5] H01J *49/00*; B01D *59/44*

U.S. Cl. 250—282 5 Claims



1. A method of analyzing molecular samples, comprising:

producing a plurality of n different primary gaseous ions from a molecular sample;

mass-selecting a first combination of about 0.5n of said n primary ions;

dissociating the selected primary ions to form from each selected primary ion a corresponding stream of secondary ions of masses different than the mass of the primary ion producing said stream;

mass-selecting the secondary ions in each stream of secondary ions;

measuring the abundances of secondary ions produced by all of said streams to obtain the mass spectrum of said secondary ions for said first combination of primary ions;

repeating the steps of mass-selecting a combination of about 0.5n of n primary ions from said sample, dissociating the selected primary ions to form corresponding streams of secondary ions, mass-selecting the secondary ions and measuring the abundances of secondary ions, each of a plurality of different combinations of primary ions, each selected combination being different than prior selected combinations, to obtain the mass spectra of secondary ions for each different combination of primary ions; and

determining from said secondary ion spectra for all of said plurality of combinations of primary ions, the abundance of each secondary ion produced from the dissociation of said primary ions to thereby identify the primary ions in the molecular sample.

4,931,640

MASS SPECTROMETER WITH REDUCED STATIC ELECTRIC FIELD

Alan G. Marshall, 3063 Glenrich Parkway, Columbus, Ohio 43221, and Mingda Wang, 692 Cuyahoga Ct., Columbus, Ohio 43210

Filed May 19, 1989, Ser. No. 355,763

Int. Cl.[5] H01J *49/38*

U.S. Cl. 250—291 37 Claims

1. Mass spectrometry apparatus comprising:

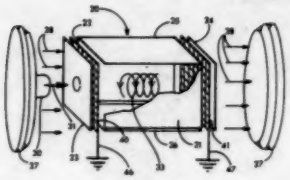
(a) an ion cell into which an ion sample may be introduced, the cell including a plurality of electrode plates that define the cell boundary, the electrode plates including trapping plates that produce a trapping potential by the application of a static voltage to the trapping plates, the trapping potential constraining movement of ions in the direction of a magnetic field to be applied to the cell;

(b) an ion generating source that produces ions in the cell;

(c) magnetic field means for creating a unidirectional magnetic field, the magnetic field means mounted so that the

unidirectional magnetic field passes through the cell in a predetermined location;

(d) at least one screen positioned within the cell proximate each of the trapping plates, the screen having a plurality of interstitial openings, and means for maintaining the screen



at a selected potential to substantially shield the interior of the cell from the potential applied to the trapping plate; and

(e) means for detecting motion of ions in the cell and providing an output signal indicative thereof.

4,931,641

RADIATION IMAGE READ-OUT APPARATUS

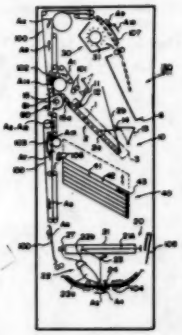
Makoto Ohgoda, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Sep. 19, 1988, Ser. No. 246,390

Claims priority, application Japan, Sep. 18, 1987, 62-234291

Int. Cl.[5] H05B *33/00*; G03B *42/02, 42/04*

U.S. Cl. 250—327.2 **4 Claims**



1. A radiation image read-out apparatus comprising:

(i) a sheet feed section capable of selectively holding one of a cassette for housing a single stimulable phosphor sheet carrying a radiation image stored thereon and a magazine for housing a plurality of stimulable phosphor sheets each carrying a radiation image stored thereon, said sheet feed section being provided with a sheet take-out means for taking said stimulable phosphor sheet out of said cassette and said magazine,

(ii) a read-out section for reading out said radiation image by exposing said stimulable phosphor sheet to stimulating rays which cause said stimulable phosphor sheet to emit light in proportion to the stored radiation energy, and photoelectrically detecting the emitted light, and

(iii) a sheet conveyance means for conveying said stimulable phosphor sheet taken out of said sheet feed section to said read-out section.

4,931,642

RADIATION IMAGE READ-OUT APPARATUS

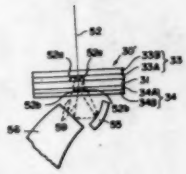
Yuichi Hosoi; Kenji Takahashi, and Satoshi Arakawa, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 5,998, Jan. 21, 1987, abandoned. This application Jul. 5, 1988, Ser. No. 214,795

Claims priority, application Japan, Jan. 21, 1986, 61-10753; Jan. 21, 1986, 61-10754; Jan. 22, 1986, 61-11657; Jan. 22, 1986, 61-11658; Jan. 22, 1986, 61-11659; Mar. 4, 1986, 61-47097; Mar. 4, 1986, 61-47098; Mar. 12, 1986, 61-53895

Int. Cl.[5] G01N *23/04*

U.S. Cl. 250—327.2 **49 Claims**



1. A radiation image read-out apparatus for two-dimensionally scanning a stimulable phosphor sheet, which carries a radiation image stored thereon, with stimulating rays which cause said stimulable phosphor sheet to emit light in proportion to the stored radiation energy, and photoelectrically reading out the light emitted by the scanned portion of said stimulable phosphor sheet by use of a photodetector,

wherein the improvement comprises the provision of a first multi-layer optical filter whose reflectively with respect to said stimulating rays increases as the angle of incidence of said stimulating rays upon said multi-layer optical filter increases, said first multi-layer optical filter being disposed in the optical path of said stimulating rays in the vicinity of said stimulable phosphor sheet or formed on the surface of said stimulable phosphor sheet on the stimulating ray irradiation side, and

a second multi-layer optical filter substantially reflecting said stimulating rays and substantially transmitting said light emitted by said stimulable phosphor sheet disposed in the vicinity of said stimulable phosphor sheet on the emitted light detection side with respect to said stimulable phosphor sheet, or is formed on the surface of said stimulable phosphor sheet on the emitted light detection side.

4,931,643

AUTORADIOGRAPHY SYSTEM FOR STIMULABLE PHOSPHOR FOILS

Heribert Amtmann, Langensendelbach, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich

Filed Oct. 24, 1988, Ser. No. 262,944

Claims priority, application Fed. Rep. of Germany, Nov. 17, 1987, 3739010

Int. Cl.[5] G01N *23/04*

U.S. Cl. 250—327.2 **10 Claims**

1. An autoradiography system comprising:

a cassette means for receiving a tissue preparation made low energy-radiation emitting, said cassette means having a housing consisting of material substantially impermeable to high energy radiation;

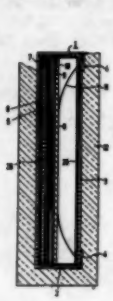
a first stimulable phosphor foil disposed in said cassette means adjacent said preparation;

a second stimulable phosphor foil disposed in said cassette means;

a shielding plate disposed in said cassette means between said first and second stimulable phosphor foils, said shielding plate consisting of material permeable to high energy radiation but impermeable to low energy radiation so that said first stimulable phosphor foil stores a first latent image

formed by high and low energy radiation and said second stimulable phosphor foil stores a second latent image formed only by high energy radiation;

means for respectively reading-out said first and second latent images to form respective first and second image signals; and



processing means for generating a visible image of said preparation from said first and second image signals including means for subtracting said second image signal from said first image signal.

4,931,644

METHOD OF ADJUSTING RADIATION IMAGE READ-OUT CONDITIONS

Yuuma Adachi; Nobuyoshi Nakajima, and Masamitsu Ishida, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

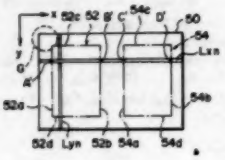
Continuation of Ser. No. 760,862, Jul. 31, 1985. This application Mar. 7, 1988, Ser. No. 164,654

Claims priority, application Japan, Jul. 31, 1984, 59-160355; Jul. 15, 1985, 60-155843; Jul. 15, 1985, 60-155844; Jul. 15, 1985, 60-155845; Jul. 15, 1985, 60-155846; Jul. 15, 1985, 60-155847; Jul. 15, 1985, 60-155848

The portion of the term of this patent subsequent to Jul. 25, 2006, has been disclaimed.

Int. Cl.[5] G03G 5/16

U.S. Cl. 250—327.2 **14 Claims**



2. A method of detecting, in an image read-out process, a radiation exposure field of a stimulable phosphor sheet carrying a radiation image which is photoelectrically read out to obtain image information in the form of digital image signals, the method comprising the steps of:

detecting digital image signals at respective positions on said stimulable phosphor sheet on the basis of the image information obtained by said photoelectric read-out, subjecting said digital image signals to a differentiation processing, and defining a radiation exposure field on said stimulable phosphor sheet by use of the differentiated values obtained thereby.

4,931,645

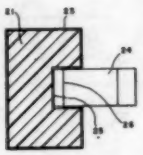
DETECTOR FOR MEASUREMENT OF RADIATION

Luther Welsh, Mountain View, Calif., assignor to National Nuclear Corporation, Santa Clara, Calif.

Filed Aug. 16, 1988, Ser. No. 232,692

Int. Cl.[5] G01T 1/20; G01J 1/58

U.S. Cl. 250—361 R **4 Claims**



1. A radiation detector comprising:

a solid translucent luminophor member having polished outer surfaces with a well formed in said luminophor;

a thin film of radiation transparent light reflective material applied to the outer surfaces of said luminophor member whereby to reflect light generated by scintillations occurring within said luminophor resulting from interaction of the luminophor with radiation impinging thereon; and

a photomultiplier tube of the type having an end window extending partially along the side of the tube inserted in said well whereby the light generated by said scintillations is coupled into the photomultiplier tube.

4,931,646

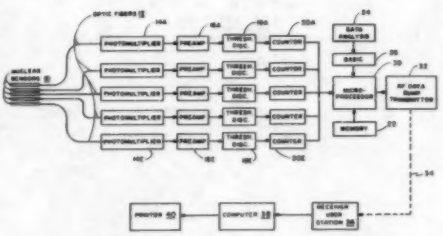
REMOTE MULTICHANNEL COINCIDENT NUCLEAR DETECTOR AND CHARACTERIZATION SYSTEM

Tom McCollum, Sterling, Va., assignor to The United States of America as Represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 17, 1989, Ser. No. 336,455

Int. Cl.[5] G01T 1/20, 1/208

U.S. Cl. 250—367 **5 Claims**



1. A multichannel coincidence nuclear detector system for detection and characterization of nuclear radiation sources moving within a remote monitored area, said system comprising:

nuclear radiation sensing means comprised of a plurality of scintillator fiber sensors, in wherein each of said plurality of scintillator fiber sensors is a line detector several meters in length comprised of an inner core material sensitive to particle nuclear radioisotopic source and a nuclear radiation transmitting outer material having a smaller index of refraction than said inner core material in which said plurality of line detector fiber sensors are positioned to measure incident nuclear radiation over a large area where the distance between the nuclear source material transported by a vehicle and said plurality of line detector fiber sensors is minimized to provide better coincidence detection of said nuclear source by all of said plurality of line detector fiber sensors simultaneously, each of said

scintillator fiber sensors is fabricated from different inner core materials to have a different spectral sensitivity with regard to gamma and neutron sources and to carry out particle and energy discrimination to determine whether an incident particle flux from a nuclear source material on said line detector fiber sensors is comprised of gamma rays or fast neutrons and the relative energy of any gamma rays;

a plurality of transmitting optical fibers, each of said plurality of line detector fiber sensors connected to one of said plurality of transmitting optical fibers to form a plurality of radiation channels for transmission of optical radiation generated in each of said line detector fiber sensors by said nuclear source material moving in the proximity of said line detector fiber sensors;

an electronics system comprised of an optical detector and amplifier means for detecting optical radiation at the input thereto from said transmitting optical fibers and converting optical radiation in each of said plurality of radiation channels to electrical pulses wherein said pulses are passed through a signal thresholding device which has a triggering threshold and a high threshold into a counter for counting said threshold pulses, a microprocessor and on-board computer based signal processing means which simultaneously analyzes said plurality of radiation channels for gamma rays of different energies and for fast neutrons to provide spectral identification of the radiation incident on said plurality of line detector fiber sensors by isolating four separate gamma bins by comparing the normalized difference between the outputs of a radiation channel with one each of said plurality of radiation channels known as a plurality of radiation channel pairs wherein the inner core materials of each of said channel pairs are selectively chosen to classify the level and type of radiation incident on each of said channel pairs, and a radio frequency link connected to said microprocessor as a multichannel detector transmitter station for transmission of information of the analyzed channel pairs; and

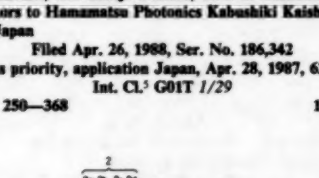
a receiver user station which selectively interrogates said multichannel detector transmitter station for information of said analyzed channel pairs wherein said transmitter station and said receiver user station have separate units comprised of a radio transceiver and a modem along with built-in batteries and interface circuitry by radio telemetry means for transmitting and receiving computer data by radio link.

4,931,647

RADIATION IMAGING APPARATUS

Teruo Hiruma, and Shinji Ohsuka, both of Shizuoka, Japan, assignors to Hamamatsu Photonics Kabushiki Kaisha, Shizuoka, Japan

Filed Apr. 26, 1988, Ser. No. 186,342
Claims priority, application Japan, Apr. 28, 1987, 62-105922
Int. Cl.[5] G01T 1/29
U.S. Cl. 250—368 **15 Claims**



1. A radiation imaging apparatus comprising:

scintillator means for converting radiation from an observing field of a sample into scintillation light;

a plurality of image intensifiers, each of said image intensifiers for amplifying said scintillation light and forming an amplified optical image corresponding to said radiation; and

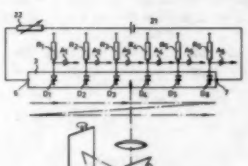
a plurality of image guides singly associated with said plurality of image intensifiers, for directing said scintillation light to said respective image intensifiers, said observing field of said sample being partitioned into a plurality of two-dimensional sections by said image guides one end of each of said image guides being closely spaced from and facing a section of said sample and the other end of each of said image guides being connected to said respective image intensifier, whereby a continuous image can be reintegrated from the outputs of said plurality of image intensifiers.

4,931,648

THERMAL RADIATION IMAGING DEVICES AND SYSTEMS

Charles T. Elliott, Worcester, and David E. Charlton, Southampton, both of Great Britain, assignors to Philips Electronic and Associated Industries Ltd., London, England

Filed Jun. 2, 1981, Ser. No. 267,611
Int. Cl.[5] G01J 5/22
U.S. Cl. 250—370.10 **9 Claims**



1. A thermal radiation imaging system comprising

(a) a semiconductor body of a given conductivity type in which free charge carriers can be generated on absorption of radiation within a certain wavelength range,

(b) spaced biasing electrode means on the body via which a bias current predominantly of majority charge carriers can be caused to flow in the body in a preferred direction and parallel to a major surface of the body, said bias current being capable of supporting an ambipolar drift of radiation-generated free minority charge carriers in the opposite direction to the flow of majority carriers,

(c) means for scanning a radiation pattern across a major surface of the semiconductor body in the same direction as the ambipolar drift and at a rate corresponding substantially to the ambipolar drift velocity whereby integration of the minority charge carriers generated by the radiation pattern occurs with the ambipolar drift, and

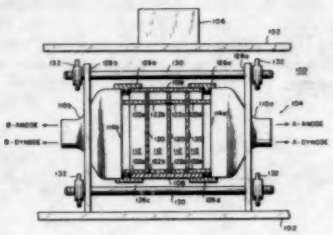
(d) plural read-out electrodes each comprising a rectifying barrier formed with the body material of said given conductivity type, which rectifying read-out electrodes are distributed in the ambipolar drift path between the biasing electrode means to detect the integrated radiation-generated minority charge-carriers in the ambipolar drift at different locations in the body.

4,931,649

NEUTRON COINCIDENCE CALORIMETER

J. Bart Czirr, Mapleton, and Gary L. Jensen, Orem, both of Utah, assignors to Brigham Young University, Provo, Utah

Filed Apr. 25, 1989, Ser. No. 342,858
Int. Cl.[5] G01T 3/06
U.S. Cl. 250—390.07 24 Claims



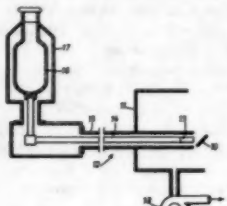
1. A neutron spectrometer comprising:
(a) a scintillator-moderator, said scintillator-moderator producing a first electromagnetic radiation pulse when an incident neutron is slowed down therein to thermal energies,
(b) a Li-6 doped glass plate disposed adjacent or within said scintillator-moderator, the thermal neutrons initiating a second electromagnetic radiation pulse upon reaction with said Li-6,
(c) photodetector means positioned adjacent to said scintillator-moderator and Li-6 doped glass plate for converting said first and second electromagnetic pulses into first and second electronic signals respectively, and
(d) electronic circuit means responsive to said first and second signals for measuring the energy of said incident neutron.

4,931,650

X-RAY DETECTORS

Barrie G. Lowe, and Stuart G. J. Tyrrell, both of High Wycombe, England, assignors to Link Analytical Limited, High Wycombe, England

Filed Jul. 20, 1988, Ser. No. 221,998
Claims priority, application United Kingdom, Aug. 5, 1987, 8718531
Int. Cl.[5] H01J 37/244
U.S. Cl. 250—397 8 Claims



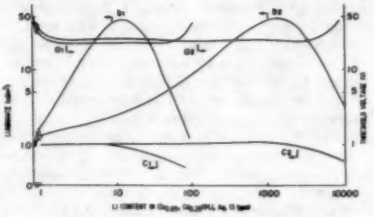
1. A detector system comprising a cold finger having a first end coupled to a heat sink at a temperature substantially below ambient temperature, an X-ray detector mounted at an opposite end of the cold finger, wherein heat is transferred along the cold finger to maintain the temperature of the x-ray detector substantially below ambient temperature during normal operation, an envelope surrounding the cold finger, wherein a vacuum is maintained between the cold finger and said envelope, and conditioning means for locally increasing the temperature of the x-ray detector for a predetermined interval while maintaining the heat sink substantially at the operating temperature and maintaining a physical link, in the form of said cold finger, between said heat sink and said detector.

4,931,651

PHOSPHORS AND FLUORESCENT COMPOSITIONS FOR EMISSION OF LIGHT UNDER LOW-VELOCITY ELECTRON EXCITATION AND FLUORESCENT DISPLAY DEVICES UTILIZING THE SAME

Akiyasu Kagami, Kanagawa, and Takashi Hase, Ebina, both of Japan, assignors to Kasei Optonix, Ltd., Tokyo, Japan

Continuation of Ser. No. 810,229, Dec. 18, 1985. This application Jul. 21, 1988, Ser. No. 222,620
Claims priority, application Japan, Dec. 18, 1984, 59-266816
The portion of the term of this patent subsequent to May 16, 2006, has been disclaimed.
Int. Cl.[5] H01J 1/63
U.S. Cl. 250—484.1 6 Claims



1. A low-velocity electron excited fluorescent display device, comprising a sealed evacuated tube, an anodic plate enclosed in said tube having a fluorescent screen on one side thereof, and a cathode enclosed in said tube standing face-to-face with said fluorescent screen, wherein said fluorescent screen contains a phosphor which is capable of emitting light of high finance under low-velocity electron excitation having the formula:

$$(Zn_{1-x}Cd_x)S:aLi,bM^I,cX,dY$$

wherein $0 \leqq x \leqq 1$, a is such that Li is present in the amount of about 1–10,000 ppm, $b \geqq 0$, $c \geqq 0$, and $d \geqq 0$, with the proviso that $c+d>0$, and wherein M^I is at least one element selected from the group consisting of Na, K Ag, Rb, Cs, Au and Cu; X is at least one element selected from the group consisting of Cl, Br and I; and Y is Al.

4,931,652

RADIATION IMAGE RECORDING AND REPRODUCING METHOD

Takashi Nakamura, Kaisei, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Jan. 28, 1985, Ser. No. 695,592
Claims priority, application Japan, Jan. 27, 1984, 59-13154
Int. Cl.[5] G01T 1/202; C09K 11/477
U.S. Cl. 250—484.1 9 Claims

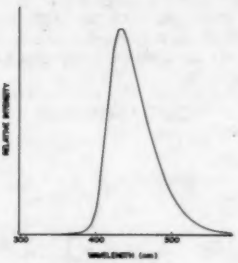
1. A radiation image recording and reproducing method comprising steps of:
(i) causing a divalent europium activated alkaline earth metal halophosphate phosphor having the formula (I):

$$M^{II}_2PO_4X:xEu^{2+} \quad (I)$$

in which M^{II} is at least one alkaline earth metal selected from the group consisting of Ca, Sr and Ba; X is at least one halogen selected from the group consisting of Cl, Br and I; and x is a number satisfying the condition of

$0<x\leqq 0.2$, to absorb a radiation having passed through an object or having radiated from an object;

(ii) exciting said phosphor with an electromagnetic wave



having a wavelength within the range of 500–800 nm to release the radiation energy stored therein as light emission; and

(iii) detecting the emitted light.

4,931,653

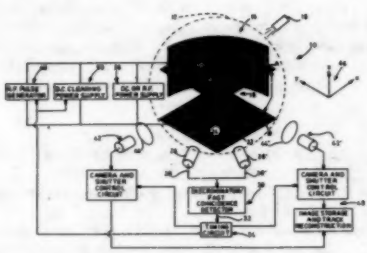
IONIZING RADIATION DETECTOR SYSTEM

Robert N. Hamm, Knoxville; Scott R. Hunter, Oak Ridge; George S. Hurst, Oak Ridge; James E. Turner, Oak Ridge, and Harvel A. Wright, Knoxville, all of Tenn., assignors to Pellissippi International, Knoxville, Tenn.

Filed Jun. 16, 1988, Ser. No. 207,723

Int. Cl.[5] G01T *1/205*

U.S. Cl. 250—385.1 **12 Claims**



1. An ionizing radiation detector system comprising:

a chamber containing a selected fluid;

a source of ionizing radiation which passes ionizing radiation into said fluid to produce thermal electrons;

dynamic electric field generating means for proportional amplification of the number of said thermal electrons and for localizing said thermal electrons proximate their respective positions of production; and

means for measuring the number and spatial distribution of at least one of said localized thermal electrons.

4,931,654

RADIANT AIR-STERILIZING APPARATUS

Wen-Jenn Horng, No. 28, Alley 1, Ta-Ho I Lane, Ta-Ho-Li, Hsi-Tun Dist., Taichung City, Taiwan

Filed Oct. 18, 1989, Ser. No. 423,030

Int. Cl.[5] A61L *9/20*

U.S. Cl. 250—436 **10 Claims**

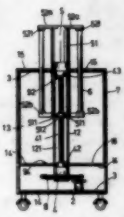
1. An air sterilizing apparatus comprising:

an enclosed housing having a first end wall provided with an outlet hole, said housing further having an air inlet opening means and an air outlet opening means,

a fan provided in the enclosed housing adjacent to said air inlet opening means;

a radiant sterilizing means provided in said enclosed housing;

means for holding said radiant sterilizing means, said holding means being movable between a first position in which said radiant sterilizing means is enclosed in said enclosed



housing and a second position in which said radiant sterilizing means extends outward from said enclosed housing through said outlet hole, said holding means incorporating a cover means which closes said outlet hole when said holding means in the first position;

means for moving said holding means, connected to said holding means; and

means for guiding said holding means to move outward and inward through said outlet hole.

4,931,655

APPARATUS FOR ACCELERATED WEATHER-TESTING OF A SAMPLE USING A METAL HALIDE LAMP

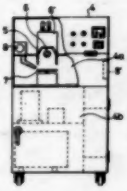
Yasuo Yoshida; Tadashi Kakinuma; Tadashi Sakurai, all of Tokyo; Yoshio Kishima, and Hirofumi Kinugasa, both of Osaka, all of Japan, assignors to Iwasaki Electric Co., Ltd., Tokyo and Dainippon Plastics Co., Ltd., Osaka, both of, Japan

Continuation of Ser. No. 674,842, Nov. 26, 1984, abandoned. This application Jul. 13, 1987, Ser. No. 73,303

Claims priority, application Japan, Nov. 30, 1983, 58-224403; Nov. 30, 1983, 58-224404

Int. Cl.[5] H01J *37/32*

U.S. Cl. 250—492.1 **6 Claims**



1. Apparatus for weather-testing a sample, comprising:

a high pressure radiation-generating metal vapor discharge lamp, said lamp being a metal halide lamp having mainly halide of iron enclosed in a lamp tube together with mercury and rare gas;

filter means surrounding the lamp for removing, from radiation generated by the lamp, wavelength components other than ultraviolet wavelength components included in sunlight incident on the earth's surface, said filter means substantially removing wavelength components other

than ultraviolet wavelength components in the wavelength range of 290-460 nm from radiation generated by said lamp;

a cooling jacket surrounding the lamp and having a transparent inner tube and an outer tube transparent at least to said ultraviolet wavelength components, said inner tube being separated from an outer surface of said lamp tube by an air gap, said outer tube being spaced from said inner tube, with said filter means disposed in the space between said inner and outer tubes, said space being isolated from said lamp, said cooling jacket having inlet and outlet means for providing a stream of liquid through said space for cooling said filter means;

means for mounting the sample to expose the sample to ultraviolet radiation transmitted through said filter means from said lamp and with an ultraviolet radiation intensity incident on said sample of at least 50 mW/cm^2;

means for blowing air onto said sample for cooling said sample to a temperature maintained below 80° C. while said sample is irradiated by said ultraviolet radiation; and

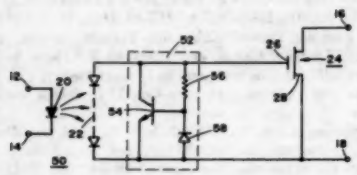
a closed chamber enclosing at least the lamp, the sample mounting means, the sample, the filter means, and the cooling jacket and forming a closed environment wherein the sample is weather-tested.

4,931,656

MEANS TO DYNAMICALLY DISCHARGE A CAPACITIVELY CHARGED ELECTRICAL DEVICE

Kenneth Ehalt, Merrick; William Sheng, Roslyn, and Bernard L. Kravitz, Forest Hills, all of N.Y., assignors to Dionics Inc., Westbury, N.Y.

Filed Mar. 7, 1988, Ser. No. 164,855
Int. Cl.[5] H01L 31/12
U.S. Cl. 250—551 **18 Claims**



1. A dynamic discharge circuit for a capacitively-charged electrical device, said device having a first element with a positive charge and a second element with a negative charge, comprising:

(a) a first conductor for attachment to said first element;

(b) a second conductor for attachment to said second element;

(c) a first transistor having its collector and emitter connected between said first and second conductor and having a first, nonconducting state and a second, conducting state; and

(d) switching means to dynamically switch said transistor between said first and second states, whereby said electrical device may be capacitively charged when said transistor is in its first state and may be discharged when said transistor is in its second state, said switching means comprising:

(i) drive means connected between the base of said first transistor and one of said first and second conductors at a first connection to provide base drive voltage to said transistor; and

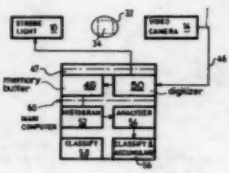
(ii) a photovoltaic diode connected between said base and the other of said first and second conductors to hold off conduction of said first transistor when said photovoltaic diode is illuminated and to allow conduction of said first transistor when said photovoltaic diode is not illuminated.

4,931,657

ON-LINE TEXTURE SENSING

Kevin C. D. Houston, Burnaby, and Roman E. Popil, White Rock, both of Canada, assignors to MacMillan Bloedel Limited, Canada

Filed Apr. 13, 1989, Ser. No. 337,659
Int. Cl.[5] G01N 21/88
U.S. Cl. 250—559 **10 Claims**



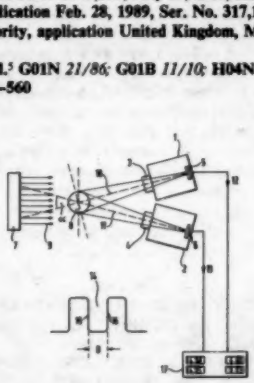
1. An optical system for determining the texture of a travelling paper web comprising a strobe light means for instantaneously illuminating areas on a first surface of said web as said web traverses said strobe light means, means to polarize said light from said strobe means in a direction substantially parallel to the plane of travel of said web thereby to illuminate each said area with light polarized parallel to the plane of said web, said beam of light being directed to said paper at an angle within 3 degrees of Brewster's angle for the paper, video camera means focused to view at least a portion of said areas when illuminated by said strobe light means, said camera means having its focal axis aligned to receive a specular light from said illuminated areas, polarized filter means to transmit to said camera only light polarized substantially parallel to the light polarized by said means to polarized said light thereby to provide video image signals representing said portions of said areas in substantially stop motion and means to analyze said video signals to determine texture characteristics of said web.

4,931,658

METHOD AND APPARATUS FOR DIMENSIONAL MEASUREMENT OF AN OBJECT

Walter R. Tole, Chinnor, England, assignor to Beta Instrument Co., Ltd., Bucks, England

Continuation of Ser. No. 49,899, May 15, 1987, abandoned. This application Feb. 28, 1989, Ser. No. 317,119
Claims priority, application United Kingdom, May 15, 1986, 8612038
Int. Cl.[5] G01N 21/86; G01B 11/10; H04N 7/18
U.S. Cl. 250—560 **6 Claims**



1. Apparatus for determining a transverse dimension of a

linearly extending longitudinal object moving continuously in a direction of travel along its longitudinal axis without restraint to movement in any direction transverse to its direction of travel, comprising:

first optical head means having a focal plane and a first optical axis passing through the linearly extending longitudinal object for continuously forming an image of the object in relation to said first optical axis and providing a continuous output representative of the size and position of the image in said first focal plane;

second optical head means having a focal plane and a second optical axis passing through the linearly extending longitudinal object and intersecting said first optical axis within the object for continuously forming an image of the object in relation to said second optical axis and providing a continuous output representative of the size and position of the image in said second focal plane;

moving means for moving the linearly extending longitudinal object in a direction of travel along its longitudinal axis past said first and second head means without restraint of the object to movement in any direction transverse to its direction of travel; and

correlating means for continuously correlating said continuous outputs of said first and second optical head means for continuously compensating for movement of the linearly extending longitudinal object in any direction transverse of its direction of travel and for making a continuous transverse dimensional measurement of the image obtained from the continuous output of one of said first and second optical head means by a positional measurement of the image obtained from the output of the other of said first and second optical head means for determining a continuous accurate measure of a transverse dimension of the linearly extending longitudinal object represented by the image.

4,931,659

DEVICE FOR CALIBRATING AN APPARATUS FOR MEASURING THE FORMATION INDEX OF A SHEET OF PAPER

Jacques Sabater, Gif sur Yvette, and Gérard Gillet, Biviers, both of France, assignors to Centre Tech. de L'Industie des Papiers cartons etc., France

Filed May 20, 1988, Ser. No. 196,728

Claims priority, application France, May 27, 1987, 87 07660

Int. Cl.[5] G01N *21/86*

U.S. Cl. 250—571 **7 Claims**

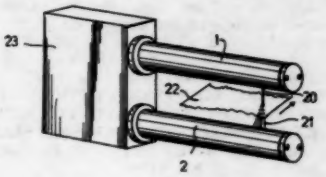
1. A device for calibrating a measuring apparatus in which an emitted light beam is directed through a sheet of paper which crosses the path of said light beam and in which the transmitted light beam is detected and processed into a modulated output signal comprising:

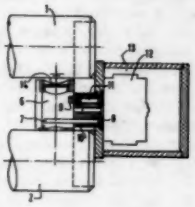
means for constantly diffusing the emitted light beam to a broad, unfocused beam,

light absorbing means rotatably mounted adjacent said emitted light beam for movement into and out of said beam, wherein said light absorbing means alternately intersects said beam at first and second positions along the axis of said beam;

said absorbing means being disposed to absorb a greater amount of emitted light in said first position within said beam and a lesser amount of emitted light in said second position within said beam;

so that rotation of said light absorbing means produces in said measuring apparatus a characteristic calibration mod-





ulation so that said measuring apparatus can be calibrated relative to said value.

4,931,660

APPARATUS FOR MEASURING FOREIGN SUBSTANCE CONTENT IN FLOWING LIQUIDS

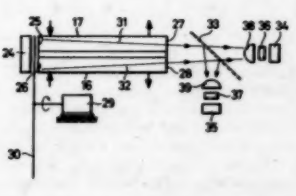
Juergen Mayer, Hanau, Fed. Rep. of Germany, assignor to Leybold Aktiengesellschaft, Cologne, Fed. Rep. of Germany

Filed Dec. 1, 1987, Ser. No. 127,072

Claims priority, application Fed. Rep. of Germany, Oct. 3, 1987, 3733573

Int. Cl.[5] G01N *15/06*

U.S. Cl. 250—575 **7 Claims**



1. Apparatus for measuring the foreign substance content in flowing liquids, especially for determining the concentration of aromatic hydrocarbons in a water stream, comprising:

a pipeline block for a process;

conduits in front of and behind the pipeline block;

a plurality of cells;

first and second detectors;

means for shunting a liquid current through said conduits in front of and behind said pipeline block for the process and for pumping flowing liquid currents into and through said cells;

a radiation source associated with said cells and having beams which penetrate said cells and carry each beam to said first detector and to said second detector;

beam filter means desposed in front of each of said detectors and dividing the beams into two beams of different wavelengths;

a rotating chopper wheel disposed between said radiation source and two of said cells, which alternately steers the beams of said radiation source into the one cell and into the other cell; and

electrical circuit means for comparing electrical signals of the detectors with one another and for processing said electrical signals to an identifying signal.

4,931,661

PHOTOELECTRIC CONVERSION DEVICE HAVING A COMMON SEMICONDUCTOR LAYER FOR A PORTION OF THE PHOTOELECTRIC CONVERSION ELEMENT AND A PORTION OF THE TRANSFER TRANSISTOR SECTION

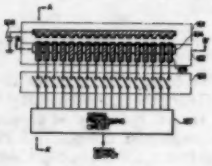
Masaki Fukaya, Isehara; Soichiro Kawakami, Nagahama; Satoshi Itabashi, Atsugi; Katsunori Terada, Sagamihara; Ihachiro Gofuku, Hiratsuka; Katsumi Nakagawa, Nagahama; Katsunori Hatanaka; Yoshinori Isobe, both of Yokohama; Toshihiro Saika, Atsugi; Tetsuya Kaneko, Yokohama; Nobuko Kitahara, and Hideyuki Suzuki, both of Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

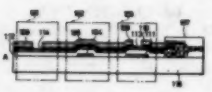
Continuation of Ser. No. 246,962, Sep. 21, 1988, abandoned, which is a continuation of Ser. No. 5,886, Jan. 22, 1987, abandoned. This application Sep. 25, 1989, Ser. No. 412,586

Claims priority, application Japan, Jan. 24, 1986, 61-11981; Jan. 24, 1986, 61-11982; Feb. 20, 1986, 61-33777; Jun. 7, 1986, 61-131099; Jun. 23, 1986, 61-144990; Jun. 30, 1986, 61-153281

Int. Cl.[5] H01L *31/00, 27/14*

U.S. Cl. 250—578.1 **18 Claims**





4. A photoelectric conversion device comprising:

a photoelectric conversion section for converting optical signals into electric signals, said photoelectric conversion section comprising a first semiconductor layer; and

a transistor section for amplifying the electric signals comprising a second semiconductor layer, wherein said first semiconductor layer and said second semiconductor layer comprise a common semi-conductor layer.

4,931,662

WAVE ENERGY SYSTEM

Lawrence C. Burton, 3020 Padlock Pl., Tallahassee, Fla. 32303

Continuation of Ser. No. 148,646, Jan. 26, 1988, abandoned. This application Mar. 6, 1989, Ser. No. 319,926

Int. Cl.[5] F03B *13/12*

U.S. Cl. 290—42 **4 Claims**

1. An apparatus for converting motion of water to usable energy which comprises:

a platform supported by the earth and extending above the high water line of said water;

a rigid beam having a first end and a second end;

rails mounted on said rigid beam;

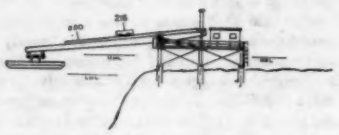
a mass movable along said rails of said rigid beam so that a selected resonant frequency of the apparatus may be obtained;

a pivot supported by said platform and pivotally supporting said beam at a point intermediate said first and second ends;

at least one pump supported by said platform;

connecting means connecting the first end of said beam to said pump so that movement of said beam operates said pump to produce fluid under pressure;

a buoyant member, said buoyant member being divided into a plurality of compartments and including an inlet and an



outlet means to add or remove fluid for each said compartment;

a universal joint connecting said buoyant member to said second end of said beam;

said buoyant member is unrestrained except for said universal joint which is the only structural connection between said buoyant member and said beam; and

power generating means operable by said fluid under pressure.

4,931,663

STARTER MOTOR

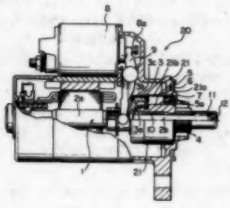
Akira Morishita, and Kazuhiro Odawara, both of Himeji, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 15, 1989, Ser. No. 310,573

Claims priority, application Japan, Feb. 26, 1988, 63-25278

Int. Cl.[5] F02N *11/00*

U.S. Cl. 290—48 **7 Claims**



1. A starter motor comprising:

A housing;

an electric motor having an output rotary shaft;

a pinion shift cylinder driven by said output rotary shaft and having a pinion for driving an engine to be started, said pinion shift cylinder having a sliding support surface exposed to the interior of said housing;

support means supported by said housing and having a sliding surface in engagement with said sliding support surface of said pinion shift cylinder for slidably and rotatably supporting it; and

cover means for covering said sliding support surface of said pinion shift cylinder.

4,931,664

CONTROLLER FOR CODED SURFACE ACOUSTICAL WAVE (SAW) SECURITY SYSTEM

William C. Knoll, Turbotville, Pa., assignor to GTE Products Corporation, Danvers, Mass.

Filed Aug. 2, 1988, Ser. No. 227,283
Int. Cl.[5] B60R 25/00
U.S. Cl. 307—10.3 35 Claims

35. A coded access ignition system for an automobile, comprising:

(a) a receptacle for receiving in proximity thereto a surface acoustical wave device;

(b) a self-propagating surface acoustical wave (SAW) device for generating an access code for said automobile, said access code being generated and self-propagated by relative movement of said SAW device with respect to said receptacle; and

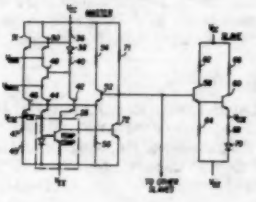
(c) validation means operatively connected to said receptacle for determining said SAW device access code and generating a signal indicative of a validation of said access code in comparison with a stored code of matching value.

4,931,665

MASTER SLAVE VOLTAGE REFERENCE CIRCUIT

Loren W. Yee, Milpitas, Calif., assignor to National Semiconductor corporation, Santa Clara, Calif.

Continuation of Ser. No. 181,014, Apr. 13, 1988, abandoned.
This application Nov. 14, 1989, Ser. No. 436,940
Int. Cl.[5] H03K 3/01, 19/086
U.S. Cl. 307—296.6 5 Claims



1. A circuit for producing a reference voltage level from a supply voltage, comprising:

a master circuit including

a circuit for producing a V_{cs} reference voltage,

means, coupled to said V_{cs} reference circuit, for producing a first voltage larger than said reference voltage by the base-emitter voltage drop of a transistor in said means for producing,

step-up means, coupled to said means for producing, for producing a second voltage larger than said first voltage by the base-emitter voltage drop of a transistor in said step-up means; and

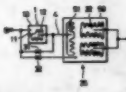
a plurality of slave circuit coupled to said master circuit, each said slave circuit including first and second transistors coupled in an emitter-follower configuration in cascade with the emitter of said first transistor coupled to the base of said second transistor.

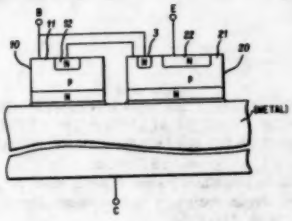
4,931,666

DARLINGTON-CONNECTED SEMICONDUCTOR DEVICE

Shinichi Ito, Kanagawa, Japan, assignor to Fuji Electric Co., Ltd., Kanagawa, Japan

Filed Apr. 21, 1987, Ser. No. 40,587
Claims priority, application Japan, Apr. 23, 1986, 61-94190
Int. Cl.[5] H03K 3/33; H01L 27/02
U.S. Cl. 307—315 4 Claims





1. A semiconductor device comprising:

a Darlington connected transistor including a drive stage transistor element and an output stage transistor element Darlington-connected to said drive stage transistor element,

said drive stage transistor element having a shorter lifetime than said output stage transistor element for increasing switching speed of said Darlington-connected transistor,

wherein said drive stage and said output stage transistor elements are formed on different semiconductor substrates.

4,931,667

CIRCUIT ARRANGEMENT FOR A DUAL BUS LINE

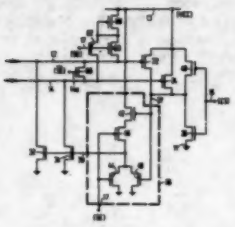
Leonardus C. M. G. Pfennings; Peter H. Voss; Cormac M. O'Connell; Cathal G. Phelan; Thomas J. Davies, and Hans Ostrop, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 2, 1988, Ser. No. 266,172
Claims priority, application Fed. Rep. of Germany, Nov. 21, 1987, 37394673
Int. Cl.[5] H03K 17/16, 17/687
U.S. Cl. 307—443 10 Claims

1. A circuit arrangement for a dual bus line for the transmission of differential signal voltages, each individual bus line of which is connected to a different input of a different amplifier which is connected to a first pole and to a second pole of a feed voltage and the operating capability of which is restricted if

the voltages at the two inputs are within a dead voltage range which is limited by the voltage at one pole of the feed voltage and by a voltage between the two poles, characterized in that an adjusting circuit is provided which is connected to both bus lines and contains

(a) detector means for generating a control signal at a control output if the voltages on both bus lines are simultaneously within the dead voltage range, and



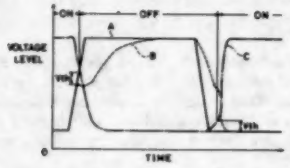
(b) a drive circuit, which is connected to both bus lines and responds to the control signal in order to change the voltages on both bus lines by essentially the same amount in the direction of the voltage at the other pole until the voltage on at least one bus line is outside the dead voltage range.

4,931,668

MIS TRANSISTOR DRIVEN INVERTER CIRCUIT CAPABLE OF INDIVIDUALLY CONTROLLING RISING PORTION AND FALLING PORTION OF OUTPUT WAVEFORM

Shigeru Kikuda; Michihiro Yamada, and Hiroshi Miyamoto, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 13, 1988, Ser. No. 143,399
Claims priority, application Japan, Jan. 16, 1987, 62-8669
Int. Cl.[5] H03K *17/16, 19/094*
U.S. Cl. 307—443 **6 Claims**



1. An inverter circuit comprising

inverter means having an input terminal and an output terminal,

means for supplying an input signal,

input resistor means connected between said input signal supplying means and the input terminal of said inverter means, and

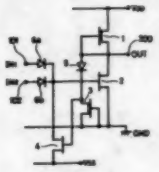
MIS transistor means having first and second conduction terminals connected to both ends of said input resistor means, respectively, and a control terminal connected to the output terminal of said inverter means for selectively bypassing said input resistor means so that either of the leading edge and the trailing edge of a signal outputted from the output terminal of said inverter means is controlled.

4,931,669

HIGH SPEED LOGIC CIRCUIT HAVING OUTPUT FEEDBACK

Norio Higashisaka, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 11, 1988, Ser. No. 167,088
Claims priority, application Japan, Mar. 11, 1987, 62-55850
Int. Cl.[5] H03K *17/30, 17/687*
U.S. Cl. 307—448 **17 Claims**



1. A logic circuit having an input and an output and powered by first and second power supplies, comprising:

level-shifting means connected to said input for shifting a level of an input signal;

a first series connection of a first fixed value resistor means and a first field effect device having a source, a drain and a gate, connected between said first power supply and a ground;

one terminal of said first fixed value resistor means being connected to said first power supply;

another terminal of said first fixed value resistor means and the drain of the first field effect device being connected together to constitute said output;

the source of said first field effect device being connected to the ground;

the gate of said first field effect device being connected so as to receive an output signal of said level-shifting means;

a second field effect device having a source, a drain and a gate, connected between the gate of said first field effect device and said second power supply, for discharging the gate of said first field effect device;

the drain of said second field effect device being connected to the gate of said first field effect device;

the source of said second field effect device being connected to said second power supply; and

feedback means connected between the gate of said second field effect device and said output interconnecting the drain of said first field effect transistor and said first fixed value resistor means for feeding back an output signal to the gate of said second field effect device.

4,931,670

TTL AND CMOS LOGIC COMPATIBLE GAAS LOGIC FAMILY

Tah-Kang J. Ting, Emmaus, Pa., assignor to American Telephone and Telegraph Company, New York, N.Y.

Filed Dec. 14, 1988, Ser. No. 284,215
Int. Cl.[5] H03K *19/017*
U.S. Cl. 307—448 **13 Claims**

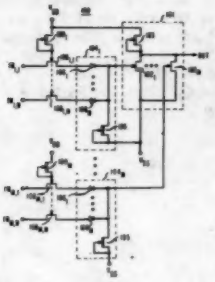
1. A logic gate having at least one input and a predetermined switching voltage, disposed in an integrated circuit, and having a logic sub-circuit with at least one clamped-type input, characterized by:

a current limiter for supplying a predetermined maximum current;

at least one FET, a gate terminal thereof coupling to the current limiter, a first source/drain terminal thereof coupling to the corresponding input to the logic sub-circuit and a second source/drain terminal thereof coupling the corresponding input to the logic gate; and,

at least one voltage dropping means coupled between the first source/drain terminal of the FET and the corre-

sponding input to the logic sub-circuit, for providing a predetermined voltage drop;



wherein the voltage dropping means determines the switching voltage of the logic gate.

4,931,671

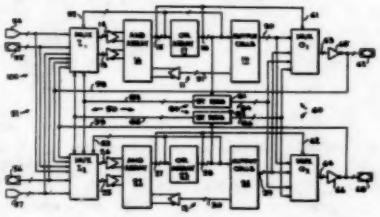
MULTIPLE ARRAY CUSTOMIZABLE LOGIC DEVICE

Om Agrawal, San Jose, Calif., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Continuation of Ser. No. 717,640, Mar. 29, 1985, Pat. No. 4,742,252. This application Apr. 7, 1988, Ser. No. 178,707

Int. Cl.[5] H03K *19/082, 19/173;* **G06F** *7/38*

U.S. Cl. 307—465 **2 Claims**



1. An integrated circuit having customizable logic, comprising:

first programmable array means having a first plurality of input lines and a first plurality of output lines wherein said first programmable array means receives a plurality of first input terms from said first plurality of input lines and generates a plurality of first output terms on said first plurality of output lines;

second programmable array means having a second plurality of input lines and a second plurality of output lines wherein said second programmable array means receives a plurality of second input terms from said second plurality of input lines and generates a plurality of second output terms on said second plurality of output lines; and

means, operatively coupled to said first programmable array means and said second programmable array means, for selectively interconnecting said plurality of first input lines, said plurality of first output lines, said plurality of second input lines, and said plurality of second output lines wherein:

said interconnect means selectively couples each of said first plurality of output lines to each of said first plurality of input lines and said second plurality of input lines so that each of said first plurality of output terms are operatively couplable to each of said first and said second pluralities of input lines; and

said interconnect means selectively couples each of said second plurality of output lines to each of said first plurality of input lines and said second plurality of input lines so that each of said second plurality of output terms are operatively couplable to each of said first and said second pluralities of input lines.

4,931,672

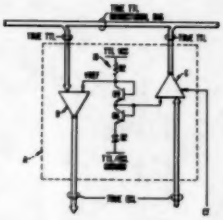
TRUE TTL TO TRUE ECL BI-DIRECTIONAL TRISTATABLE TRANSLATOR DRIVER CIRCUIT

Aurangzeb K. Khan, San Bruno, Calif., assignor to Tandem Computers Incorporated, Cupertino, Calif.

Continuation of Ser. No. 123,486, Nov. 20, 1987, abandoned. This application Mar. 3, 1989, Ser. No. 318,435

Int. Cl.[5] H03K *19/092, 19/086, 19/00*

U.S. Cl. 307—475 **19 Claims**



1. A transceiver circuit for translating true ECL input signals to true TTL tri-state output signals and for translating true TTL input signals to true ECL output signals, the transceiver circuit comprising:

(a) an ECL/TTL circuit for translating true ECL input signals, which have a HIGH state and a LOW state, and true ECL tri-state control signals, which have a HIGH state and a LOW state, to true TTL tri-state output signals which have a HIGH state, a LOW state, and a high impedance state, the ECL/TTL circuit comprising:

(i) an ECL/TTL translator means for translating said true ECL input signals which have a HIGH state and a LOW state to corresponding true TTL signals which have a HIGH state and a LOW state;

(ii) a TTL output driver means electrically coupled to the translator means for receiving said true TTL signals which have a HIGH state and a LOW state from said translator means and outputting corresponding true TTL tri-state output signals which have a HIGH state and a LOW state;

(iii) a tri-state controller means electrically coupled to the TTL output driver means for quickly switching the TTL output driver means into a true TTL tri-state high impedance state based on said true ECL tri-state control signals without converting said true ECL tri-state control signals into TTL tri-state control signals;

(b) a TTL/ECL circuit for translating true TTL input signals, which have a HIGH state and a LOW state, to true ECL output signals which have a HIGH state and a LOW state, the TTL/ECL circuit comprising:

(i) an input reference means for defining an input reference threshold of the true TTL input signals which have a HIGH state and a LOW state;

(ii) an input receiver circuit electrically coupled to the input reference means for translating true TTL input signals which have a HIGH state and a LOW state from said input reference means to corresponding true ECL signals which have a HIGH state and a LOW state;

(iii) an ECL output driver means electrically coupled to the input receiver circuit for receiving true ECL signals which have a HIGH state and a LOW state from said input receiver circuit and outputting corresponding

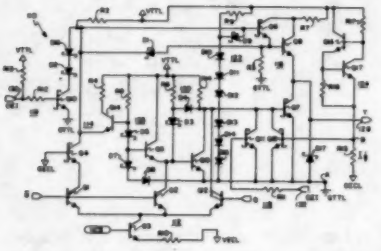
true ECL output signals which have a HIGH state and a LOW state.

4,931,673

ECL-TO-TTL TRANSLATOR CIRCUIT WITH GROUND BOUNCE PROTECTION

Kianoosh Naghshineh, Menlo Park, Calif., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Oct. 2, 1989, Ser. No. 415,754
Int. Cl.[5] H03K *19/092, 19/088*
U.S. Cl. 307—475 17 Claims



1. An ECL-to-TTL translator circuit for converting ECL logic level signals to TTL logic level signals, said translator circuit comprising:

ECL circuit means (112) for receiving true and complementary data input signals having ECL logic levels and for generating input signals;

input stage means (114) responsive to said input signals for generating first and second control signals;

TTL output stage means (116) responsive to said control signals for generating at an output terminal an output signal which is TTL compatible, said output stage means including an upper TTL output transistor (Q8) and a lower TTL output transistor (Q7), said upper output transistor having its collector coupled to a TTL power supply potential via a current-limiting resistor (R7), its base coupled to receive said first control signal, and its emitter connected to said output terminal, said lower output transistor having its collector connected to said output terminal, its base coupled to receive said second control signal and its emitter connected to a TTL ground potential;

ground bounce protection circuit means (124) coupled to said lower output transistor for maintaining said lower output transistor in its turned-off condition when said ground potential is being pulled down due to the switching of said output terminal between a low logic level and a high logic level; and

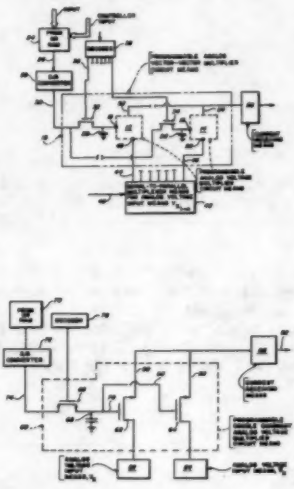
said ground bounce protection circuit means (124) including a voltage-independent current source, a reference resistor (R15), and a switching transistor (Q15), said current source being coupled between said TTL power supply potential and one end of said reference resistor (R15) to provide a reference voltage, the other end of said resistor (R15) being connected to an ECL ground potential, said switching transistor (Q15) having its collector connected to the base of said lower output transistor (Q7), its base connected to said one end of said reference resistor (R15), and its emitter connected to said TTL ground potential.

4,931,674

PROGRAMMABLE ANALOG VOLTAGE MULTIPLIER CIRCUIT MEANS

Francis J. Kub, Severna Park; Ingham A. Mack, Laurel, and Keith K. Moon, Beltsville, all of Md., assignors to United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Nov. 16, 1988, Ser. No. 271,820
Int. Cl.[5] G06G *7/00*; H03F *3/16*
U.S. Cl. 307—529 33 Claims



1. A programmable analog voltage multiplier circuit means providing a current output that is a product of analog voltage inputs, said multiplier circuit means comprising:

programmable analog voltage multiplier circuit means |PAVMCM| having high impedance analog voltage |HIAV| programming input means, analog voltage input means and current source output means,

programming analog voltage means having at least one programmed analog voltage input of predetermined value for the HIAV programming input means,

capacitor means and switch means, the capacitor means for dynamically storing a programmed analog voltage input of predetermined value when the switch means is closed and for applying a dynamically stored programmed analog voltage input to the HIAV input means of the PAVMCM when the switch means is opened,

the switch means being connected to the programming analog voltage means and the capacitor means,

the capacitor means being connected to the HIAV programming input means of the PAVMCM,

external analog voltage input means being connected to the analog voltage input means of the PAVMCM, the external analog voltage input means providing an analog voltage input of preselected value for the analog voltage input means of the PAVMCM, and

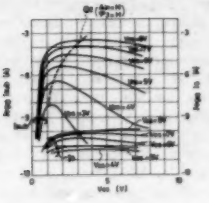
the current source output means of the PAVMCM providing an analog multiplied current output that is the product of the programmed analog voltage input of the HIAV programming input means of the PAVMCM and the analog voltage input of the external analog voltage input means during use of the PAVMCM.

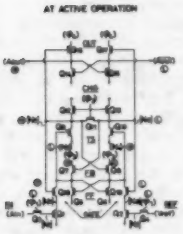
4,931,675

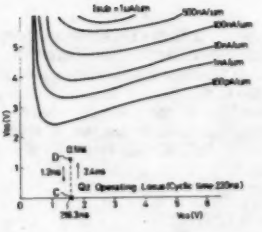
SEMICONDUCTOR SENSE AMPLIFIER

Yoshihisa Iwata, Kanagawa, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Nov. 25, 1986, Ser. No. 934,785
Claims priority, application Japan, Mar. 5, 1986, 61-47691
Int. Cl.[5] H03K *3/356, 3/013, 17/04, 19/01*
U.S. Cl. 307—530 **7 Claims**







1. A semiconductor sense amplifier of address buffer circuit for converting a TTL level signal to complementary MOS level signals, comprising:

(a) address signal input means responsive to a TTL level address signal;

(b) reference signal input means responsive to a reference signal;

(c) flip-flop means connected to said address signal input means and said reference signal input means for latching a voltage level of the TTL level address signal on the basis of a difference in potential between said address signal input means and said reference signal input means;

(d) feedback means connected to said flip-flop means for outputting complementary feedback signals;

(e) first gate means connected between said reference signal input means and said flip-flop means for disconnecting said reference signal input means from said flip-flop means in response to a complementary feedback signal from said feedback means, whenever said flip-flop means is set in response to the TTL level address signal; and

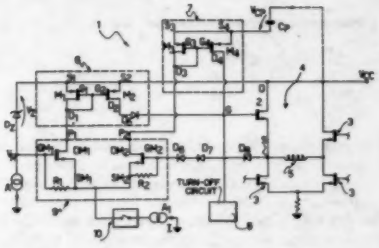
(f) second gate means connected between said address signal input means and said flip-flop means for realizing a complementary circuit configuration.

4,931,676

LOW-ABSORPTION CIRCUIT DEVICE FOR CONTROLLING A POWER TRANSISTOR INTO THE ON STATE

Antonella Balocchi, Vigevano, and Angelo Alzati, Bollate, both of Italy, assignors to SGS-Thomson Microelectronics S.R.L., Milano, Italy

Filed Jan. 18, 1989, Ser. No. 298,652
Claims priority, application Italy, Feb. 29, 1988, 19588 A/88
Int. Cl.[5] H03K *17/687, 3/01;* **G05F** *3/16;* **H03F** *3/45*
U.S. Cl. 307—571 **11 Claims**



1. A low absorption circuit for controlling a DMOS power transistor having gate, drain and source electrodes and connected for driving an electrical load when switched from an off state to an on state, said low absorption circuit comprising:

(a) a first voltage supply means,

(b) a second voltage supply means that has a higher voltage than that of the first voltage supply means,

(c) a first turn-on circuit connected to the first voltage supply means for supplying a first turn-on voltage to the DMOS power transistor gate,

(d) a second turn-on circuit connected to the second voltage supply means for supplying a second higher turn-on voltage to the DMOS power transistor gate,

(e) a comparator having respective inputs connected to a reference voltage and to the DMOS power transistor gate and respective outputs connected to the first and second turn-on circuits.

4,931,677

ELECTRO-MAGNETIC LINEAR DRIVE

Götz Heidelberg, Am Hügel 16, D-8130 Starnberg-Percha; Andreas Gründl, Haseneystrasse 20, D-8000 München 70, and Peter Rosner, Waltherstrasse 16, D-8000 München 2, all of Fed. Rep. of Germany

Continuation of Ser. No. 946,651, Dec. 23, 1986, abandoned, which is a continuation of Ser. No. 647,706, Sep. 5, 1984, abandoned. This application Aug. 7, 1989, Ser. No. 391,637
Claims priority, application Fed. Rep. of Germany, Sep. 5, 1983, 3331953
Int. Cl.[5] H02K *41/00;* **B60L** *13/02*
U.S. Cl. 310—12 **12 Claims**

1. An electromagnetic linear drive system, comprising:

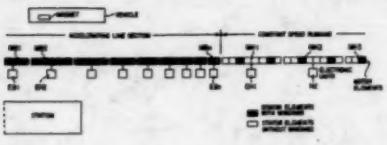
a series of equal-length, electrically activable stator sections arranged consecutively along a linear path;

a series of motor elements arranged consecutively along said path, each motor element including a predetermined number of said equal-length, electrically activable stator sections;

a vehicle adapted for movement along said path, said vehicle having a magnetic portion thereon cooperative with said motor elements for electromagnetically moving said vehicle along said path;

a series of substantially equal performance power supply units, each connected to a different one of said motor elements for supplying a substantially equal amount of electrical power to each motor element and concurrently activating said predetermined number of electrically activable stator sections included in that motor element, said predetermined number of electrically activable stator sections being inversely related to a selected electromagnetic force required along the length of that motor element to create a desired incremental velocity change in the vehicle as it passes from one end of that motor element to the other end thereof;

sensor means disposed along said path and influenced by the



movement of said vehicle along said path, said sensor means being connected to said motor elements for individually activating and deactivating the power supply unit supplying electrical power to each motor element to selectively supply said electromagnetic force along the length of that motor element, said electromagnetic force interacting with said magnetic portion to create said incremental velocity change; and,

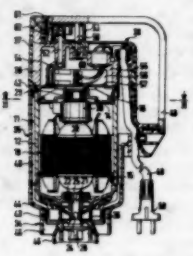
the stator sections in at least some of said series of motor elements being spaced apart by at least one non-electrically activable spacing section functioning to close the magnetic circuitry of such motor elements and diminish the total per-length electromagnetic force of such motor elements.

4,931,678

DOUBLE-INSULATED AIR-COOLED ELECTROMOTOR FOR BARREL PUMP

Karl Lutz, Salon-de-Provence-Ring 36, D-6980 Wertheim, Fed. Rep. of Germany

Filed Jan. 5, 1989, Ser. No. 293,730
Int. Cl.[5] H02K 9/06
U.S. Cl. 310—62 **21 Claims**



1. An improved shielding for an electromotor having a motor housing which is sealed at both of its axial ends by means of a pair of support shields, a stator, and rotor operatively mounted in said motor housing, wherein the interior of the motor housing is sealingly closed and the rotor is rotatably mounted in the region of one of the support shields of said pair of shields by means of a motor shaft axially ext ending from said rotor and rotatably mounted and extending through one of the support shields of said pair of shields outside of the motor housing, an air impeller wheel is coaxially mounted on said support shaft outside the motor housing for transporting cooling air, said air impeller includes an outer shield made out of electrically nonconducting material in which the air impeller wheel is coaxially and operatively mounted, said outer shield surrounds the motor housing at a predetermined distance and thereby forms of through-stream paths for cooling air for the motor housing so as to externally cool it, and electrically non-conducting cladding means mounted on the drive-side end of the motor shaft, said electromotor being adapted as a drive motor for a barrel or container pump,

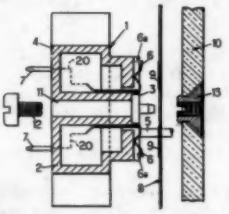
the improvement comprising a motor housing being encapsulated with double-protective electric insulation means, wherein said electric insulation means comprise an exterior shield which includes a pair of support shields respectively mounted at opposite axial ends of said motor housing, said electric insulation means further include a pair of housing caps operatively mounted at each axial end of said motor housing and between which latter pair there extends a housing middle portion which is spaced from the motor housing, a mantle extending bet ween said pair of caps, said mantle and housing middle portion defining a through-stream passage therebetween for the flow of cooling air, said impeller wheel is coaxially mounted on a shaft stub of said motor shaft, said stub extends outside of the motor housing at its drive-side and is disposed within the housing cap, one of said pair of caps overlap the corresponding support shield received therein and by means of this overlapping housing cap an outwardly directed streaming path for the cooling air is defined extending from the impeller wheel through said one housing cap, which outward streaming path is partially formed by said through-stream passage between said housing middle portion and said mantle surrounding same, which path is in streaming communication with an air inlet means in said electric insulation means and has outlet means on the drive side of the electromotor directed in a substantially parallel axial direction.

4,931,679

PRINTED CIRCUIT BOARD COMPONENTS WITH ALTERNATE MOUNTING MODES

Joel Fournier, Cergy, France, assignor to Societe d'Applications Generales d'Electricite, Paris, France

Filed Mar. 30, 1989, Ser. No. 330,490
Claims priority, application France, Apr. 6, 1988, 88 04539
Int. Cl.[5] H05K 1/00; H01R 27/00
U.S. Cl. 310—71 **5 Claims**



1. Electrical component equipped for electrical connection with a printed circuit board, said component being provided with two alternative sets of contacts, each set having at least two separate contacts, the contacts of one set being mechanically different from the contents of the other set, with each respective contact of one set being interconnected electrically with a respective contact of the other set,

one of these sets of contacts being constituted by contacts adapted to ensure electrical connections by simple elastic mechanical pressure directly on respectively situated facing conducting spots of the circuit board, mechanical

fastening means being in addition provided to fix the electrical component mechanically to the printed circuit board associated with said conducting spots,

the other of these sets of contacts being differently constituted by contacts extending from said component and adapted to be mechanically secured to respective conducting spots of the circuit board,

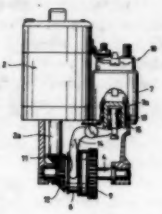
due to which the component is selectively mounted on the printed circuit board, either on a side of the printed circuit board having printed circuits with the contacts of the one set of contacts cooperating then by elastic pressure with the conducting spots of the printed circuits, or on the opposite side of the circuit board with the contacts of the other set of contacts passing through the printed circuit board and being fastened to the conducting spots on the side of the printed circuit board having the printed circuits.

4,931,680

SIDE MOUNTING STARTER WITH BEVEL GEAR OUTPUT

Takeshi Sugiyama, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 31, 1989, Ser. No. 330,860
Claims priority, application Japan, Apr. 1, 1988, 63-44916
Int. Cl.[5] H02K *7/118*; F02N *15/02*
U.S. Cl. 310—83 **4 Claims**



1. A starter device comprising:

an electric motor having an armature rotary shaft;

an output rotary shaft arranged to intersect the axis of said armature rotary shaft of said electric motor in the axial direction thereof;

a pair of bevel gears secured to said armature rotary shaft and said output rotary shaft, respectively, and engaged with each other to transmit the rotation of said armature rotary shaft to said output rotary shaft at a reduction gear ratio;

a pinion slidably mounted on said output rotary shaft and detachably engaged with an engine ring gear; and

a clutch means for providing said detachable engagement of said pinion.

4,931,681

ONE-PIECE SUPPORT AND END COVER STRUCTURE FOR ELECTRIC MOTORS

Terzino Spaggiari, Correggio, Italy, assignor to SPAL s.r.l., Correggio, Italy

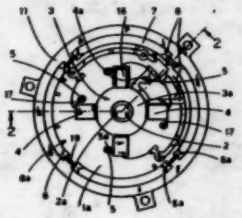
Filed May 9, 1989, Ser. No. 349,577
Claims priority, application Italy, May 17, 1988, 4832/88[U]
Int. Cl.[5] H02K *1/18, 21/28*
U.S. Cl. 310—89 **8 Claims**

1. A combined support and end cover structure for dc motors with a commutator at one end and permanent magnet type stator pole pieces, comprising:

a first element embodied substantially in the form of a disk and constituting a cover for the end of the electric motor occupied by the commutator, the internal face of which affords a first socket providing a journal bearing for the shaft of the motor;

a plurality of hollow holders associated with the internal face of the first element near to the first socket, each provided with at least one lateral slot and accommodating a respective brush contact;

a plurality of pins, issuing one alongside each hollow holder from the internal face of the firs element and serving as anchors for relative tension springs against which the single brush contacts are loaded;



a plurality of posts serving to support the permanent magnet pole pieces of the motor, projecting perpendicularly from points equally spaced around the periphery of the first element and fashioned with a longitudinal groove on either side;

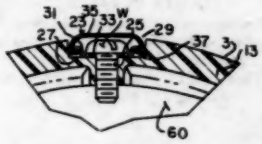
a plurality of radial fins each exhibiting a projection at one end, distributed around the periphery of the first element and occupying the spaces between successive posts in such a way as to provide stops against which the permanent magnet pole pieces are positioned.

4,931,682

SHIMLESS/GROUNDLESS DYNAMOELECTRIC MACHINE

John G. Lewis, St. Louis County, Mo., assignor to Emerson Electric Co., St. Louis, Mo.

Filed Oct. 7, 1988, Ser. No. 255,757
Int. Cl.[5] H02K *5/08*
U.S. Cl. 310—89 **5 Claims**



1. In a dynamoelectric machine including a stator assembly, and a rotor assembly including a shaft mounted for rotation with respect to the stator assembly, and a rotor affixed to and rotatable with the shaft, the improvement comprising means for assembling the stator and rotor assemblies into a motor, said motor when assembled, insulating the stator and rotor assemblies from electrical contact with other objects whereby the motor does not require electrical grounding when installed in an intended application, the assembly means comprising a shell formed of an electrically non-conductive material in which the stator and rotor assemblies are placed, the shell defining a cavity having first and second ends, and means for closing said first and second ends including means for rotatably supporting said shaft, one of said means for closing said first and second ends being integrally formed with said shell, wherein screws are inserted through the shell to secure the stator, the assembly means further including an electrically

non-conductive overcap system for preventing electrical contact with said screws.

4,931,683

HOUSING FOR A SMALL MOTOR

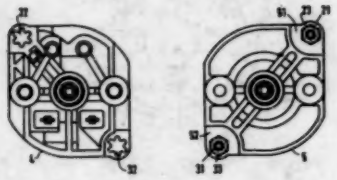
Ronald Gleixner, Ochsenfurt, and Anton Heidenfelder, Wurzburg, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Oct. 24, 1986, Ser. No. 922,707

Claims priority, application Fed. Rep. of Germany, Nov. 30, 1985, 8533902[U]

Int. Cl.[5] H02K 5/04

U.S. Cl. 310—89 5 Claims



1. A small motor comprising:

a motor casing (1) with two axial ends faces;

first and second bearing brackets (4, 5) disposed at said end faces;

stud screws (2, 3) extending axially along said motor casing for bracing indirectly said brackets together, said stud screws having screw heads (22, 32) with a star-shaped outer profile at one end, said first bearing bracket having insertion recesses with a complementary star-shaped profile matching said screw heads for positively holding said screw heads, said stud screws further having free screw ends (21, 31) projecting axially beyond said second bearing bracket (5) for attaching said motor to a holding device; and

attachment nuts (23, 33) mounted on said free screw ends (21, 31) and firmly applied against said second bearing bracket (5).

4,931,684

DIGITALLY SCANNED EXTENDED ELECTRON SOURCE IN VACUUM

Juris A. Asars, Murrysville Boro, and Michael E. Colbaugh, Penn Township, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Dec. 23, 1988, Ser. No. 289,099

Int. Cl.[5] H01J 1/02

U.S. Cl. 313—3 6 Claims

1. A scanned extended electron source comprising a plurality of excitation conductors connected to a plurality of cathodes for generating electrons, each cathode connected to only one excitation conductor such that an adjacent cathode is connected to a different excitation conductor, the cathodes being spaced apart and arranged in a linear array along the length of the extended electron source such that each excitation conductor in turn is activated by a series of pulses such that the generation of the electrons propagates along the extended electron source from one cathode to another.

4,931,685

DISCHARGE LAMP

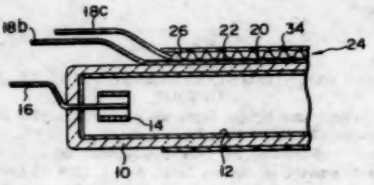
Yoshitomi Debuchi, Fujisawa, and Rikio Yamamoto, Kawasaki, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Aug. 19, 1988, Ser. No. 233,814

Claims priority, application Japan, Aug. 21, 1987, 62-127338[U]

Int. Cl.[5] H01J 61/52

U.S. Cl. 313—15 16 Claims



1. A discharge lamp comprising:

a bulb having an inner surface on which a phosphor layer is formed and an electrode installed inside, said bulb containing mercury and a rare gas therein;

a heater unit, attached to the outer surface of the bulb and extending in the axial direction of the bulb for heating the bulb to promote the evaporation of the mercury contained, said heater unit having a thin flexible heater and a film member prefixed at least on one side of the heater to reinforce the heater; and

covering means fitted over the outer surface of the bulb to enclose the heater unit, for fixing the heater unit to the outer surface of the bulb.

4,931,686

COPPER CORE SIDE ELECTRODE SPARK PLUG SHELL

Charles D. Oakley, Lapeer, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Sep. 6, 1988, Ser. No. 240,286

Int. Cl.[5] H01T 13/20, 13/32

U.S. Cl. 313—141 10 Claims

6. A metal spark plug shell for assembly with an insulator body having a center electrode to form a spark plug, comprising:

(a) an elongate hollow metal shell body having an end with a cylindrical threaded outer surface, an adjacent unthreaded outer surface recessed radially inwardly of said threaded outer surface and disposed axially outboard of said threaded outer surface so as to terminate in an annular end lip, and a slot extending axially from the threaded outer surface along the unthreaded outer surface toward said end lip, said slot having a first slot portion in the

threaded outer surface and a second slot portion in the unthreaded outer surface, and

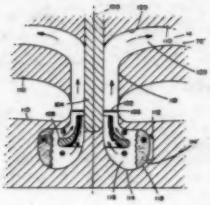
(b) a composite side electrode having a copper core in an outer oxidation-resistant sheath, said side electrode including an axially extending attachment end secured in said slot, said attachment end including (1) a first attachment portion received in the first slot portion and having an outer side threaded substantially contiguously with said threaded outer surface and (2) a second attachment portion received in the second slot portion and having an unthreaded outer side substantially coextensive with said unthreaded outer surface.

4,931,687

SPARK GAP SWITCH HAVING A TWO-PHASE FLUID FLOW

William J. Thayer, Kent, Wash., assignor to Spectra-Physics, Inc., San Jose, Calif.

Filed Oct. 12, 1988, Ser. No. 257,286
Int. Cl.[5] H01J *1/08, 7/24;* H01H *33/82*
U.S. Cl. 313—231.01 14 Claims



1. A spark gap switch for transferring electrical energy from a source to a load in a series of sparks, comprising:

a pair of electrodes,

a dielectric housing,

a purge gas inlet and outlet,

a flow channel, defined by a wall and adjacent the spark gap, duct, diffuser and exhaust duct, for producing a flow of a fluid from the inlet through the spark gap in response to each spark produced by the spark switch; and

means for injecting a two-phase purge fluid having liquid and gaseous phase components of two different densities generally tangentially to the wall of the source region to generate a circulating flow of the two-phase fluid in the spark gap along the wall, with the liquid component of the two-phase fluid preferentially adjacent to the wall.

4,931,688

MULTIFUNCTION GAS TRIODE

Christopher H. Tosswill, Glen Cove, Me., assignor to Galileo Electro-Optics Corp., Sturbridge, Mass.

Filed Jan. 19, 1988, Ser. No. 145,418
Int. Cl.[5] H01J *1/16*
U.S. Cl. 313—336 6 Claims

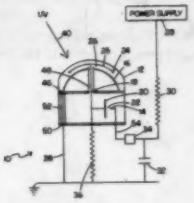
1. A gas triode comprising

an anode,

a cathode, and

a control electrode, said control electrode having a trigger portion and a corona portion,

said trigger portion being spaced from said anode to provide an anode gap, and



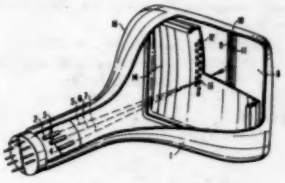
said corona portion being spaced from said cathode to provide a cathode gap, said corona portion being connected to said trigger portion.

4,931,689

COLOR DISPLAY TUBE

Maria C. Van Uden, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 879,830, Jun. 26, 1986, abandoned, which is a continuation of Ser. No. 636,535, Aug. 1, 1984, abandoned. This application Mar. 4, 1988, Ser. No. 164,040
Claims priority, application Netherlands, Mar. 14, 1984, 8400806
Int. Cl.[5] H01J *29/80*
U.S. Cl. 313—402 1 Claim



1. A color display tube comprising, in an evacuated envelope:

means for generating a number of electron beams;

a display screen having regions luminescing in different colors when struck by the beams; and

a color selection electrode situated between the beam generating means and the display screen, the color selection electrode consisting essentially of a plate having apertures for passing the electron beams and associating each electron beam with luminescent regions of one color,

and an electron reflecting layer on the side of the color selection electrode remote from the display screen,

characterized in that the layer is a heavy metal containing glass layer consisting essentially of 76 to 80% by weight (52 to 56 mole percent) of lead oxide, 15 to 20% by weight (33 to 45 mole percent) of boron oxide, 0 to 6% by weight (0 to 11 mole percent) of zinc oxide and 0.5 to 2% by weight (1 to 4 mole percent) of cobalt monoxide.

4,931,690

COLOR PICTURE TUBE WITH AN ELECTRON SHIELD

Takemitsu Kokubu, and Hiroshi Yoshioka, both of Mobara, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

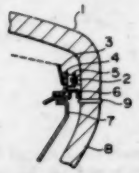
Filed Feb. 19, 1988, Ser. No. 157,789
Claims priority, application Japan, Mar. 20, 1987, 62-63789
Int. Cl.[5] H01J *29/07, 29/84*
U.S. Cl. 313—407 12 Claims

1. A color picture tube comprising:

a support frame fixed to an inner wall surface of an envelope of the color picture tube;

a shadow mask fixed to said support frame at a position opposite to a phosphor screen coated on a panel glass of said color picture tube; and

an electron shield fixed to said support frame and disposed along an outer periphery of said shadow mask on the side



remote from said phosphor screen, said electron shield being formed by press-shaping a strip of a very low carbon steel containing not more than 0.02% by weight of carbon and having folds or corrugations formed at its marginal edge area adjacent to and parallel with the inner wall surface of said envelope for enabling a distance between an outer peripheral end face of said electron shield and an inner wall surface of said panel glass to be minimized.

4,931,691

ELECTRON GUN ASSEMBLY HAVING A REINFORCED HEATER TAB WITH LOCATING MEANS

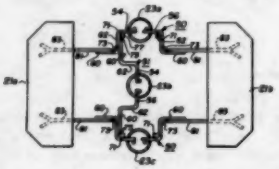
John R. Hale, Lancaster, Pa., assignor to RCA Licensing Corp., Princeton, N.J.

Filed Aug. 30, 1988, Ser. No. 238,079

The portion of the term of this patent subsequent to Dec. 6, 2005, has been disclaimed.

Int. Cl.[5] **H01J** *29/02, 29/48*

U.S. Cl. 313—417 **6 Claims**



1. In an electron gun assembly for use in a color cathode-ray tube, said gun assembly including a pair of insulating support rods, three inline indirectly heated cathodes including a center cathode and two outer cathodes for generating three electron beams, attachment means for attaching said cathodes to said support rods, a heater for each of said cathodes, each of said heaters having a pair of heater legs, a pair of reinforced heater tabs associated with said outer cathodes and a conformal heater tab associated with said center cathode, each of said heater tabs having a main body portion including a first and a second part, each of said parts being attached to a respective leg of one of said heaters, each of said heater tabs having a pair of outwardly directed feet, each of said feet being connected to a respective part of the parts of the main body portion by a pair of orthogonal legs extending therebetWeen, said reinforced heater tabs including a first reinforcing structure extending between said parts of said main body portion and said orthogonal legs, and also a second reinforcing structure extending between said orthogonal legs and said feet to maintain the rigidity of said reinforced heater tab, oppositely disposed pairs of heater bead straps secured to said support rods, said feet of said reinforced heater tabs being affixed to a different one of said oppositely disposed pairs of heater bead straps to provide a substantially rigid, box-like structure, said feet of said conformal heater tab being attached to one of said orthogonal legs of each of said reinforced heater tabs, said conformal heater tab being disposed between said reinforced heater tabs, wherein the improvement comprises

said first reinforcing structure including a substantially rectangular first depression interconnecting each of said first and second parts of said main body portion and said orthogonal legs, each of said first depressions including first locating means for positioning said feet of said conformal heater tab or said orthogonal legs of each of said reinforced heater tabs.

4,931,692

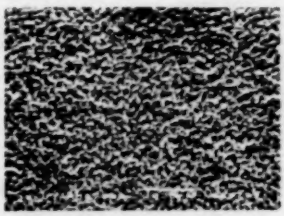
LUMINESCING MEMBER, PROCESS FOR PREPARATION THEREOF, AND ELECTROLUMINESCENT DEVICE EMPLOYING SAME

Hiroshi Takagi, Yokohama; Kazuaki Ohmi, Hadano; Masao Sugata, Yokohama; Hisanori Tsuda, Atsugi, and Takahiko Ishiwatari, Yamato, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 12, 1988, Ser. No. 256,472

Int. Cl.[5] **H05B** *33/14*

U.S. Cl. 313—503 **49 Claims**



1. A luminescent member which emits light upon application of excitation energy thereto, having a luminescing part comprising an ultrafine particle film formed by deposition of ultrafine particles containing at least one element selected from the group consisting of Si, C and Ge.

4,931,693

ION BOMBARDMENT BARRIER LAYER FOR A VACUUM TUBE

Daniel Gaily, Grenoble, and Pierre P. Jobert, St. Egreve, both of France, assignors to Thomson-CSF, Paris, France

Continuation of Ser. No. 808,517, Dec. 13, 1985, abandoned. This application Aug. 23, 1988, Ser. No. 235,323

Claims priority, application France, Dec. 18, 1984, 84 19362

Int. Cl.[5] **B05D** *3/06;* **H01J** *31/50, 40/18;* **C23C** *16/00*

U.S. Cl. 313—528 **12 Claims**

6. A light image intensifier vacuum tube comprising an envelope in which there are included a photocathode for emitting electrons, an extraction layer over one face of the photocathode for facilitating the emission of electrons from the photocathode, a slab including the photocathode in the path of the emitted electrons, a luminescent target in the path of electrons passing through the slab, and an ionic bombardment barrier layer on the surface of the slab facing the cathode for passing the emitted electrons but blocking ions from flowing from the slab to the photocathode, characterized in that the barrier layer is a layer between 30 and 300 Angströms, which is of a stable compound of silicon and nitride with a refractive index between 1.8 and 1.9.

10. A method for the manufacture of an image intensifier vacuum tube which utilizes an ionic bombardment barrier layer over one face of a microchannel slab adapted to permit photoelectrons from a photocathode to pass through to the microchannel slab but to block ions from passing from the

microchannel slab and bombarding the photocathode in which the method of forming the ionic bombardment barrier layer comprises the steps of

depositing an organic film over the face of the microchannel slab where the barrier layer is to be formed,

depositing by a low temperature plasma-enhanced chemical vapor phase process a layer of a compound of nitrogen and silicon of a thickness between 30 and 300 Angströms, and

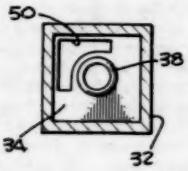
heating the microchannel slab for eliminating the organic film and adhering the layer of the compound of nitrogen and silicon on the face of the microchannel slab.

4,931,694

COUPLED CAVITY CIRCUIT WITH INCREASED IRIS RESONANT FREQUENCY

Robert S. Symons, Los Altos, and Mark F. Kirshner, San Francisco, both of Calif., assignors to Litton Systems, Inc., Beverly Hills, Calif.

Filed Jun. 1, 1988, Ser. No. 201,560
Int. Cl.[5] H01J *25/34*
U.S. Cl. 315—3.5 **20 Claims**



1. A microwave electron tube, having at least a pair of coupled cavities, comprising:

said coupled cavities having a polygonal shape with aligned sidewalls; and

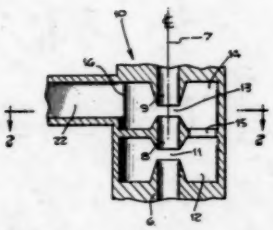
an iris for coupling said coupled cavities located in one corner of said polygonally shaped cavities.

4,931,695

HIGH PERFORMANCE EXTENDED INTERACTION OUTPUT CIRCUIT

Robert S. Symons, Los Altos, Calif., assignor to Litton Systems, Inc., Beverly Hills, Calif.

Filed Jun. 2, 1988, Ser. No. 202,190
Int. Cl.[5] H01J *25/10*; H01P *7/06*; H03F *3/56*; H03B *9/04*
U.S. Cl. 315—5.39 **10 Claims**



1. An extended interaction output circuit [EIOC] for interacting with a modulated electron beam and for outputting RF electromagnetic energy, said EIOC comprising:

a pair of coupled cavities having a predetermined image impedance;

said coupled cavities also having predetermined output load impedance, said output load impedance being approximately one half the magnitude of said image impedance.

4,931,696

FLUORESCENT LAMP STARTER ASSEMBLY

Boyd G. Brower, Williamsport, Pa., assignor to GTE Products Corporation, Danvers, Mass.

Continuation of Ser. No. 19,388, Feb. 26, 1987, abandoned. This application Jan. 10, 1989, Ser. No. 296,313
Int. Cl.[5] H01J *7/44*
U.S. Cl. 315—61 **13 Claims**

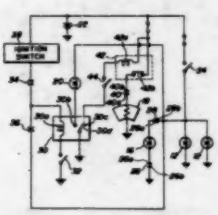
1. In a fluorescent lamp including a fluorescent tube having electrode means supported therein, a base from which the fluorescent tube is supported, and pin means attached to and projecting from said base for enabling energy coupling to said electrode means, a circuit board assembly within said base and comprising; lamp starting circuit means including a glow bottle, a circuit board having conductive runs thereon and having a hole therein to receive an end of said glow bottle, said conductive runs having a concave cut-out portion, means connecting the lamp starting circuit means to the circuit board conductive runs, means connecting the lamp electrode means to the circuit board conductive runs, and means electrically coupling said pin means to the circuit board conductive runs including an electrical coupling lead soldered to said conductive runs immediately adjacent said concave cut-out portion.

4,931,697

POWER SUPPLY CIRCUIT FOR AUTOMOTIVE BRAKE LAMP

Yoshihiro Nakajima, Kanagawa, Japan, assignor to Nissan Motor Co., Ltd., Japan

Continuation of Ser. No. 104,119, Oct. 5, 1987, abandoned. This application Aug. 3, 1989, Ser. No. 393,099
Claims priority, application Japan, Oct. 7, 1986, 61-238436
Int. Cl.[5] B60Q *1/00*
U.S. Cl. 315—77 **14 Claims**



1. A high-mount brake lamp arrangement for an automotive vehicle having a detachable body component comprising:

a first high-mount brake lamp mounted on a detachable body component of a vehicle for external observation when the detachable body component is installed on the vehicle;

a second high-mount brake lamp mounted on the vehicle in the vicinity of the detachable body component for exter-

nal observation when the detachable body component is removed;

a power supply;

a manually operable switch connected to said power supply and to a vehicle brake pedal to be turned ON responsive to application of the brake pedal;

an ignition switch connected to said power supply;

first means for establishing a first communication between said first high-mount brake lamp and said manually operable switch while the detachable body component is installed for causing said power supply to supply electrical power to said first high-mount brake lamp to illuminate said first high-mount brake lamp in response to turning ON said manually operable switch;

second means for establishing a second communication between said second high-mount brake lamp and said manually operable switch while the detachable body component is opened or removed from the vehicle body for causing said power supply to supply electrical power to said second high-mount brake lamp in response to turning ON said manually operable switch; and

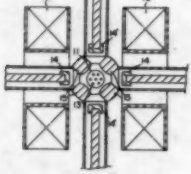
third means, associated with said second means, for establishing a third communication between said second high-mount brake lamp and said power supply while the detachable body component is open or removed when one of said manually operable switch and said ignition switch is ON, thereby illuminating said second high-mount brake lamp, and for blocking said third communication when both of said manually operable switch and said ignition switch are OFF.

4,931,698

ION SOURCE

Yoshikazu Yoshida, Sakai, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Japan

Filed Apr. 12, 1989, Ser. No. 336,934
Claims priority, application Japan, Apr. 12, 1988, 63-89852
Int. Cl.[5] H01J 27/04
U.S. Cl. 315—111.81 **9 Claims**



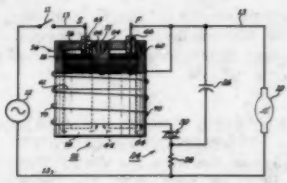
1. An ion source comprising a discharge chamber that has a gas inlet and an ion exit, two pairs of cathodes that are disposed on the side surfaces of said discharge chamber, two pairs of anodes, each anode being disposed in a space between the adjacent cathodes, and a pair of solenoids that are wrapped around one pair of cathodes so as to be mutually repulsive magnetically, wherein there is no magnetic field in the central axis of the other pair of cathodes around which no solenoids are wrapped.

4,931,699

BALLAST SYSTEM INCLUDING A STARTING AID FOR A GASEOUS DISCHARGE LAMP

David W. Knoble, East Flat, N.C., assignor to General Electric Company, Schenectady, N.Y.

Filed Jan. 6, 1989, Ser. No. 294,029
Int. Cl.[5] H05B 41/16, 41/24
U.S. Cl. 315—276 **12 Claims**



1. A ballast system for a gaseous discharge lamp comprising:

(a) a reactor coil for connection in series with said lamp and adapted to be energized with power-frequency current during lamp operation,

(b) core structure of magnetizable material forming a magnetic circuit for flux developed by power-frequency current through said coil and comprising the following components: a leg surrounded by said coil, two yokes at opposite ends of said leg, and flux-return structure connected between said yokes radially outside said coil,

(c) means for developing a high voltage pulse of a pulse width equal to that characteristic of a kilocycle voltage wave for initiating operation of said lamp, comprising:

(i) an ignitor coil surrounding said flux-return structure and said reactor coil and inductively coupled to said reactor coil with respect to pulse components in the kilocycle frequency range, and

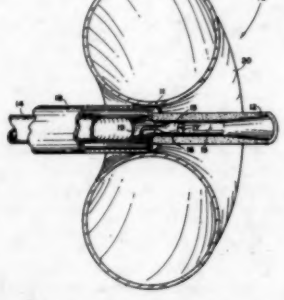
(ii) means for supplying a high rate-of-change current pulse to said ignitor coil, thereby inducing said high voltage pulse across said reactor coil for application to said lamp.

4,931,700

ELECTRON BEAM GUN

Jay L. Reed, 1015 Silcox Branch Cir., Oviedo, Fla. 32765

Filed Sep. 2, 1988, Ser. No. 239,681
Int. Cl.[5] H01J 29/48
U.S. Cl. 315—111.81 **8 Claims**



8. An electron beam gun driven by a very high voltage source comprising:

a conductive torus having a central opening;

a ceramic tube disposed along an axis perpendicular to the plane of said torus and through said central opening;

a conductive tube disposed along said axis connected to a proximal end of said ceramic tube;

a gas hose concentric with said conductive tube and having a proximal end in communication with said ceramic tube at its said proximal end;

a conductive aerodynamic body centered in said ceramic tube to form a convergent-divergent annular venturi, said body having a surface facing a distal end of said ceramic tube, said surface forming an electron emitting cathode, said body electrically connected to said torus and said conductive tube;

a source of high molecular weight gas connected to a distal end of said gas hose, said gas entering said annular venturi at a stagnation pressure to thereby achieve supersonic gas flow in said ceramic tube, said supersonic gas flow producing a vacuum in a region of said ceramic tube adjacent said cathode electrode; and

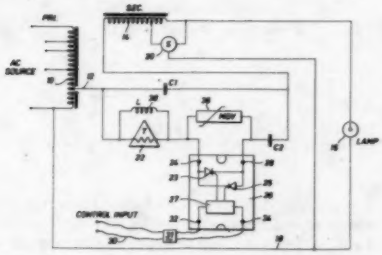
said very high voltage source connected to said conductive tube to drive said torus and said cathode electrode highly negative thereby causing high field emission of an electron beam therefrom, wherein an electric field from said torus maintains said beam along said torus axis.

4,931,701

BI-LEVEL BALLAST CIRCUIT FOR OPERATING HID LAMPS

Michael J. Carl, New Braunfels, Tex., assignor to Wide-Lite International Corporation, San Marcos, Tex.

Filed Jul. 6, 1988, Ser. No. 215,605
Int. Cl.[5] H05B *41/42*
U.S. Cl. 315—240 **8 Claims**



1. A bi-level ballast circuit for operation an HID lamp alternatively in a reduced energy standby mode and a full light output mode, comprising

a magnetic transformer ballast having an input connection to an ac power source,

an unswitched capacitor connected in series with the output of said transformer ballast and with the lamp to ensure at least a reduced power level applied to the lamp,

a switched capacitor connected to said unswitched capacitor and the lamp,

a control power source, and

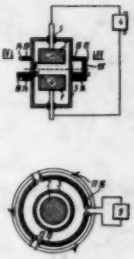
control switching means connected to said switched capacitor and connectable to said control power source for increasing the total capacitance and thereby the total power applied to the lamp to operate the lamp at a full light output level, said switching means including closing and opening contacts to said switched capacitor that operate only at the time the voltage level of the applied ac power source passes through zero.

4,931,702

ELECTRIC-ARC DEVICE

Alexandr V. Voronin; Vladimir M. Kuznetsov; Boris P. Peregud, and Alexandr I. Russkov, all of Leningrad, U.S.S.R., assignors to Fiziko-Tekhnicheskiy Institut Imeni A.F. Ioffe an SSSR, Leningrad, U.S.S.R.

Filed Jun. 13, 1988, Ser. No. 206,046
Int. Cl.[5] H05B *41/00*; H01J *1/50*
U.S. Cl. 315—344 **1 Claim**



1. An electric-arc device comprising a positive cylindric electrode and a negative cylindric electrode mounted in alignment with and defining an arc gap therebetween; and

means for stabilizing the position of an electric arc in said arc gap including at least two coils each of which is made as a rectangular loop bent round a cylindrical surface and having a first arcuate side and a second arcuate side and two straight sides, and at least one power supply for energizing said coils, said coils being mounted around said electrodes such that said first and second arcuate sides thereof form two respective circumferences whose centers lie on a line parallel to the axis of said electrodes, the length of each of said straight sides of each of said coils being no less than the length of said arc gap, said coils being connected to said power supply such that the direction of currents flowing along said first arcuate sides of said coils is opposite to that of currents flowing along said second arcuate sides of said coils, the location of each of said coils with respect to a plane passing through the middle of said arc gap normal to the axis of said electrodes being limited by two extreme positions, in the first one of said extreme positions said coil being symmetric about said plane, and in the second one of said extreme positions said coil being displaced towards said negative electrode and one of said arcuate sides of said coil lying in said plane.

4,931,703

S-DISTORTION CORRECTING CIRCUIT FOR CRT

Masanori Ogino, Yokohama, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Aug. 15, 1990, Ser. No. 393,959
Claims priority, application Japan, Aug. 26, 1988, 63-210702
Int. Cl.[5] H01J *29/56, 29/70*
U.S. Cl. 315—370 **7 Claims**

1. A S-distortion correcting circuit for a picture tube equipped with a main deflection coil and a horizontal deflection circuit for driving said main deflection coil, comprising:

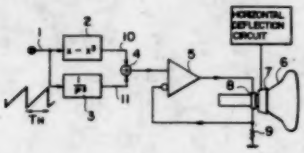
a first circuitry receiving a horizontal scanning signal from the horizontal scanning circuit for thereby generating on the basis of said horizontal scanning signal a correction signal for cancelling out horizontal S-distortion produced in dependence on a geometrical relation between the scanning locus of an electron beam and the plane of a screen of the picture tube;

a second circuitry receiving the horizontal scanning signal of the horizontal deflection circuit to thereby generate on the basis of said horizontal scanning signal a correction

signal for cancelling out horizontal S-distortion which is in inverse proportion to the second power of the horizontal scanning frequency and generated in the horizontal deflection circuit;

means for adding together both the correction signals generated by said first circuitry and said second circuitry;

an auxiliary deflection coil;



current detecting means for detecting a current of said auxiliary deflection coil to thereby output a signal proportional to said current; and

a negative feedback circuitry receiving as inputs thereto the output of said adder means and the output of said current detecting means for supplying to said auxiliary deflection coil such an output that the output of said current detecting means substantially coincides with the output of said adder means.

4,931,704

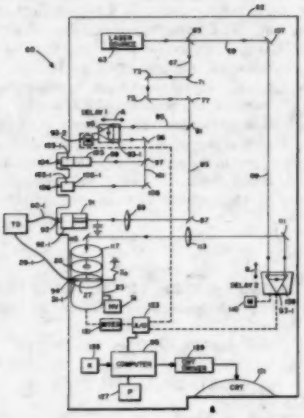
ULTRAFAST SAMPLING OSCILLOSCOPE

Robert R. Alfano, 3777 Independence Ave., Bronx, N.Y. 10463, and Ardie D. Walser, 1407 Linden Blvd., Apt. 13B, Brooklyn, N.Y. 11212

Filed Dec. 9, 1988, Ser. No. 281,679

Int. Cl.[5] H01J *29/52, 43/04, 40/06*; G01R *23/16*

U.S. Cl. 315—384 **18 Claims**



1. A sampling oscilloscope for time resolving picosecond voltage pulses with femtosecond resolution comprising:

(a) means for generating a femtosecond pulse of light,

(b) means for splitting said femtosecond pulse of light into a plurality of pulses each traveling along a different beam path,

(c) a first output port providing an output pulse signal related to the pulse of light traveling along a first one of the beam paths,

(d) a photomultiplier tube having a photocathode, an accellerating mesh and an anode, the photocathode being positioned along a second one of the beam paths,

(e) means negatively biasing the accellerating mesh relative to the anode,

(f) an input port for receiving a picosecond voltage pulse to be time resolved, the input port being coupled to the photocathode, and

(g) means coupled to the anode of the photomultiplier tube for displaying the voltage signal at the anode of the photomultiplier tube,

(h) whereby, a picosecond voltage pulse may be applied to the input port to negatively bias the photocathode relative to the accellerating mesh producing a voltage signal at the anode of the photomultiplier tube when the picosecond voltage pulse and the light pulse traveling along the second path overlap in time and space on the photocathode.

4,931,705

CIRCUIT ARRANGEMENT FOR TEXTILE MACHINES, PARTICULARLY SPINNING MACHINES HAVING INDIVIDUALLY MOTOR-DRIVEN SPINDLES

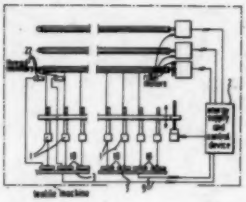
Stefan Wieczorek, Fellbach, Fed. Rep. of Germany, assignor to SKF Textilmaschinen-Komponenten GmbH, Fed. Rep. of Germany

Filed Aug. 19, 1988, Ser. No. 234,136

Claims priority, application Fed. Rep. of Germany, Aug. 21, 1987, 3727939

Int. Cl.[5] H02P *7/67*

U.S. Cl. 318—49 **12 Claims**



1. For use in textile machine including aggregates having individually driven spindles and individual drive motors associated with said spindles, said aggregates being mounted adjacent to one another to form a row, and a plurality of motor bars forming a row parallel to the row of aggregates, each of said motor bars being spatially and functionally associated with a respective aggregate; the circuit arrangement comprising:

(a) means for supplying energy to said circuit arrangement;

(b) a plurality of elongated ground plates having at least one surface;

(c) a plurality of energy supply conductors on the surface of each ground plate;

(d) a plurality of motor bars arranged in groups on at least two of said elongated ground plates, in which

(i) said ground plates extend to form a row of ground plates parallel to the row of motor bars,

(ii) said ground plates have a length dimension generally corresponding to the length dimension of the group of motor bars carried thereby and to the associated group of aggregates in the direction of the ground plate row; and

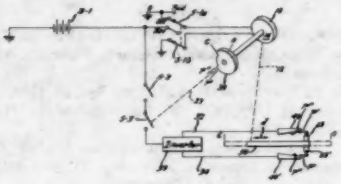
(e) means for connecting each successive group of two adjacent ground plates in a row of ground plates to said means for supplying energy.

4,931,706

ELECTRICAL CIRCUIT FOR PROTECTING A POWER SUPPLY CONNECTED TO APPLY SIGNALS TO A RETRACTABLE SUNROOF CONTAINING MATERIALS THAT RESPOND TO AN APPLIED ELECTRICAL SIGNAL

Kenneth J. Gajewski, Woodhaven, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Oct. 5, 1988, Ser. No. 253,524
Int. Cl.[5] H02P 3/00
U.S. Cl. 318—282 7 Claims



1. A circuit connected to a mechanism for controlling the movement of a retractable sunroof panel on an automotive vehicle, wherein the sunroof panel contains elements that react to the application of an electrical signal, comprising:

a source of drive voltage;

a motor connected to said mechanism for controlling the movement of said sunroof panel;

a first switch means connected between said source and said motor for selecting the drive direction of said sunroof panel;

a second switch means mechanically connected to said motor to open and close a first conducting path to said sunroof panel elements and a second conducting path to said source according to predetermined positions of said sunroof panel; and

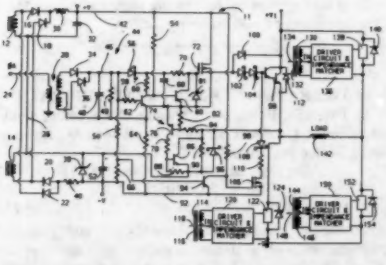
a power supply means being connectable through said second switch means via said second conducting path to said source and via said first conducting path to said sunroof panel elements for applying said electrical signal thereto.

4,931,707

IMPEDANCE MATCHING CIRCUIT

Robert J. Disser, Dayton, and Richard N. Lehnhoff, Kettering, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Aug. 14, 1989, Ser. No. 393,358
Int. Cl.[5] G05F 1/10
U.S. Cl. 318—293 5 Claims



1. In a driver circuit which is sensitive to the input impedance of a device to which it is connected, the driver circuit connected to a drive transistor that provides power for an inductive load, the drive transistor having on times during which it is normally forward biased but may be reverse biased due to load inductance, the drive transistor also having an input circuit having a low input circuit impedance when reverse biased and a high input circuit impedance when forward biased, the improvement comprising:

variable impedance means connected in series with the drive transistor input circuit so that the input impedance sensed by the driver circuit is the combined impedance of the drive transistor and the variable impedance means, the impedance means comprising an impedance element and a shunt element, the impedance element having a value such that, when the drive transistor is reverse biased, the combined impedance of the drive transistor input circuit and the impedance element is equal to the impedance of the drive transistor input circuit when the drive transistor is forward biased, the shunt element operating to selectively shunt the impedance element; and

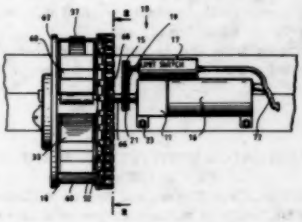
a control means for signaling the shunt means to connect the impedance element when the drive transistor is reverse biased, and signaling the shunt element to shunt the impedance element when the drive transistor is forward biased, whereby the input impedance sensed by the driver circuit remains substantially constant during on times of the drive transistor.

4,931,708

INDEPENDENT BAND SPRING DOOR GEAR MOTOR OPERATOR

Thore Johnsen, 2976 Islip Ct., Wantagh, N.Y. 11793

Filed Oct. 5, 1989, Ser. No. 417,509
Int. Cl.[5] E06B 9/08, 9/72
U.S. Cl. 318—466 15 Claims



1. A power assist device for raising and lowering an independent band spring door, comprising:

(a) prime mover means, said prime mover means include a gear motor, said gear motor is a 12 volt direct current electrical gear motor;

(b) means for controlling said prime mover means, said controlling means include a gear motor operator;

(c) a band spring cage; and

(d) means for mechanically connecting said controlling means to said band spring cage, said mechanical connecting means include a planetary roller chain gear set, said planetary roller chain gear set has only a roller chain ring gear and a pinion gear sprocket.

4,931,709

NC UNIT PROCESSING METHOD

Yoshiaki Ikeda, and Kuwasawa Mitsuru, both of Tokyo, Japan, assignors to Fanuc Ltd., Minamitsuru, Japan

PCT No. PCT/JP87/00212, § 371 Date Dec. 3, 1987, § 102(e) Date Dec. 3, 1987, PCT Pub. No. WO87/06363, PCT Pub. Date Oct. 22, 1987
PCT Filed Apr. 6, 1987, Ser. No. 141,598
Claims priority, application Japan, Apr. 7, 1986, 61-079557
Int. Cl.[5] G05B 19/10
U.S. Cl. 318—567 2 Claims

1. A numerical control unit processing method for executing

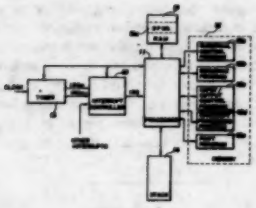
numerical control processing based on a numerical control program, sequence processing based on a sequence program, and input/output processing based on an input/output program, comprising the steps of:

(a) executing input/output processing based on the input-/output program;

(b) interrupting the input/output processing in response to a first timer interrupt;

(c) storing a position of the input/output program in a first predetermined storage area;

(d) executing numerical control processing based on the numerical control program;



(e) executing sequence processing based on the sequence program after conclusion of the numerical control program;

(f) interrupting the sequence processing upon generation of a second timer interrupt;

(g) storing a position of the sequence program in a second predetermined storage area;

(h) executing highest level processing to restore input/output processing based upon the position of the input/output program stored in step (c); and

(i) repeating steps (a)–(h) with the sequence processing executed in step (e) starting at the position stored in step (g).

4,931,710

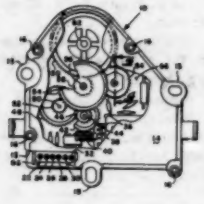
SERVOACTUATOR WITH FEEDBACK AND METHOD OF CALIBRATING

Dennis DeVara, Carol Stream, and Andrew A. Kenny, Roselle, both of Ill., assignors to Eaton Corporation, Cleveland, Ohio

Filed Apr. 5, 1988, Ser. No. 177,729

Int. Cl.[5] G05B *1/06*

U.S. Cl. 318—663 **20 Claims**



1. A servoactuator comprising:

(a) housing means;

(b) motor means mounted on said housing means and operable upon electrical energization to provide rotation of a motor shaft;

(c) speed reducing means driven by said motor shaft and having an output gear means adapted for connection to a device to be driven;

(d) feedback means having a rotatable input shaft means having a rotatable input shaft means, said feedback means adapted for connection to a source of electrical potential and operative thereupon to provide an electrical signal indicative of the rotational position of said input shaft means, said feedback means including driven gear means engaging said speed reducing output gear means;

(e) a retaining member movable axially with respect to said input shaft means between a first position permitting relative rotation between said driven gear means and said retaining member and a second position preventing relative rotation therebetween; and,

(f) means operable to transmit torque between said retaining member and said input shaft means.

4,931,711

INDUSTRIAL ROBOT CONTROL APPARATUS

Hatsumi Naruo, Oume, Japan, assignor to Fanuc Ltd, Minamitsuru, Japan

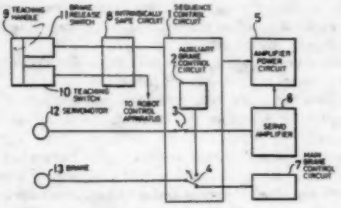
PCT No. PCT/JP88/00938, § 371 Date Apr. 28, 1989, § 102(e) Date Apr. 28, 1989, PCT Pub. No. WO89/02811, PCT Pub. Date Apr. 6, 1989

PCT Filed Sep. 14, 1988, Ser. No. 350,709

Claims priority, application Japan, Sep. 22, 1987, 62-238125

Int. Cl.[5] G05B *19/42*

U.S. Cl. 318—568.13 **4 Claims**



1. An industrial robot control apparatus for teaching an industrial robot and operating the robot in accordance with the teaching, comprising:

a teaching handle having a teaching switch and a brake release switch;

a servomotor;

dynamic brake means for said servomotor;

a mechanical brake for said servomotor, said mechanical brake being released when an electrical current is supplied thereto and operated when the electric current is shut off;

a servo amplifier;

a sequence control circuit operable to bring said servo amplifier to a stop condition and to release said dynamic brake and said mechanical brake in response to a signal from said brake release switch; and

teaching memory means for storing taught positions through the operation of said teaching switch.

4,931,712

MULTIPLE CHANNEL SERVO CONFIGURATION

Peter C. DiGiulio, Bridgeport; Norman J. Bergman, Danbury, and Edilberto I. Salazar, Brookfield, all of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.

Filed Dec. 28, 1988, Ser. No. 291,474

Int. Cl.[5] G05B *11/32*

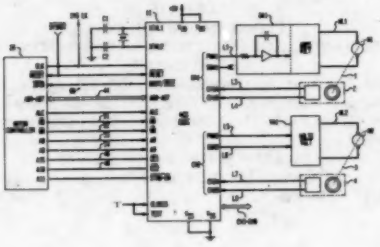
U.S. Cl. 318—625 **12 Claims**

1. A multiple channel servo system for engaging in bus communication with a micro-controller, motor driver means for driving a plurality of motors and motor servo informing means for providing servo information for selected ones of said motors, said micro-controller to generate respective motion command profile information for each of said selected motors, comprising:

first means for receiving and storing said motion command

profile information from said micro-controller for said selected motors;

servo means for sequentially comparing said respective servo information with said respective motor command information and generating respective motor control information for said respective motor for causing said motor driver to cause said respective motor to closely track said respective motion command profile,



said servo means having,

second means for receiving and storing microcode for each said selected motors;

an arithmetic logic unit (ALU) selectively configurable for said selected motors in accordance with said microcode such that said arithmetic logic unit can be reconfigured to sequentially generate respective motor control information for said selected motors.

4,931,713

RECTIFIER ELECTRIC DRIVE

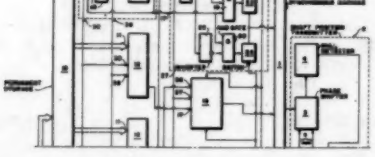
Ljudmila I. Matjukhina; Alexandr S. Mikhalev; Sergei N. Sidoruk, and Igor M. Chushenkov, all of Minsk, U.S.S.R., assignors to Belorussky Gosudarstvenny Universitet Imeni V.I. Lenina, Minsk, U.S.S.R.

PCT No. PCT/SU87/00055, § 371 Date Jan. 13, 1989, § 102(e) Date Jan. 13, 1989, PCT Pub. No. WO88/09081, PCT Pub. Date Nov. 17, 1988

PCT Filed May 14, 1987, Ser. No. 302,598

Int. Cl.[5] H02P *5/28*

U.S. Cl. 318—632 **2 Claims**



1. A rectifier electric drive comprising:

a synchronous machine (1) having windings and being provided with a shaft position transmitter (2), said shaft position transmitter (2) having an output;

a permanent storage (10) containing codes of duration and polarity of power supply pulses of said windings of said synchronous machine (1), said permanent storage (10) having an address input, outputs and an output bus, said output of said shaft position transmitter (2) being electrically connected to said address input of said permanent storage (10);

a plurality of code-to-pulse duration converters (12) equal in number to the number of windings of said synchronous machine (1), each said code-to-pulse duration converter (12) having a control input (11), an output, a pulse frequency master input (30), and a triggering input (36), said output bus of said permanent storage (10) being connected to said control inputs (11) of said code-to-pulse duration converters (12);

a plurality of switching devices (18) equal in number to the number of windings of said synchronous machine (1), each said switching device (18) having a pulse duration master input (17), a pulse polarity master input (26), and a control signal polarity master input (27), said outputs of said code-to-pulse duration converters (12) being connected to said pulse duration master inputs (17) of said switching devices (18), said pulse polarity master inputs (26) of said switching devices (18) being connected to said respective outputs of said permanent storage (10), said control signal polarity master inputs (27) of said switching devices (18) being joined to each other and provided with means to receive a polarity signal of a control signal, and said outputs of said switching device (18) being connected to said windings of said synchronous machine (1);

a master oscillator (32) having an output;

a controlled frequency divider (28) having an input (31), a control input (29), and an output, said output of said master control oscillator (32) being connected to said input (31) of said controlled frequency divider (28), said control input (29) of said controlled frequency divider (28) receiving a control signal modulus code, and said output of the controlled frequency divider (28) being connected to said pulse frequency master inputs (30) of said code-to-pulse duration converters (12);

a voltage source (25) connected to said switching devices (18); and

a voltage-to-pulse repetition period conversion unit (34) having a first input (35), a second input (33), and an output, said first input (35) of said voltage-to-pulse-repetition period conversion unit (34) being connected to said voltage source (25), said second input (33) of said voltage-to-pulse-repetition period conversion unit (34) being connected to said output of said master oscillator (32), and said output of said voltage-to-pulse-repetition period conversion unit (34) being connected to said triggering inputs (36) of said code-to-pulse duration converter (12).

4,931,714

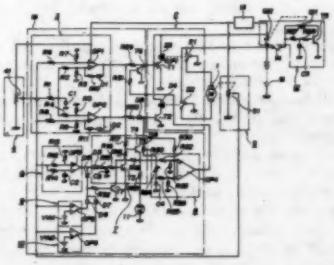
DEVICE FOR LIFTING UP AND DOWN WINDOW GLASS FOR VEHICLE

Harushige Yamamoto, Tokyo, Japan, assignor to Niles Parts Co., Ltd., Tokyo, Japan

Filed Sep. 16, 1988, Ser. No. 245,670

Int. Cl.[5] G05B *11/18*

U.S. Cl. 318—663 **4 Claims**



1. A device for lifting up and down window glass for vehicle comprising;

a reversible motor for lifting up and down window glass of a vehicle;

drive circuit means connected to an input side of said reversible motor;

control circuit means connected to an input side of said drive circuit means; and

window glass opening degree detection means connected to an input side of said control circuit means so as to output voltage in accordance with window glass opening degree, said control circuit means includes locking detection means which outputs a signal when the output voltage of said window glass opening degree detection means exceeds a predetermined value during the window glass moves in abnormal manner; and

said control circuit means further includes reversing circuit means which biases energy to said reversible motor for a predetermined period of time so as to open the window glass upon receiving the output signal from said locking detection means; and

said control circuit means still further includes a release circuit means for outputting a signal to release the operation of said reversing circuit means, when the output signal of said window glass opening degree detection means becomes below a predetermined value upon reaching of the window glass at the near portion of the lowermost position thereof.

4,931,715

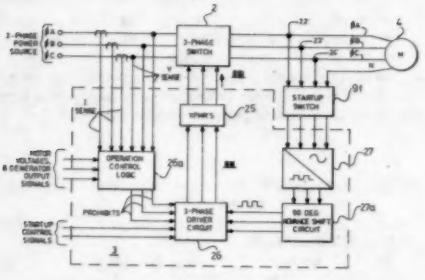
SYNCHRONOUS MOTOR TORQUE CONTROL DEVICE

Robert H. Lee, Fullerton; Alexander Levran, Los Angeles; Chi Mak, Downey; Gerald L. Smith, Torrance, and Jacek J. Marcinkowski, San Pedro, all of Calif., assignors to Teledyne Inet, Torrance, Calif.

Continuation-in-part of Ser. No. 926,220, Nov. 3, 1986, abandoned. This application Feb. 16, 1988, Ser. No. 156,289

Int. Cl.[5] H02P 1/24

U.S. Cl. 318—709 **5 Claims**



1. A method for controlling the torque developed by an electrical polyphase synchronous motor that receives energy from an electrical three-phase sinusoidal power source, said motor coupled to a generator and/or to an inertial load; comprising the steps of:

(a) sensing motor line-to-neutral voltage for each phase at the motor terminals and transmitting the sensed voltages to switch control circuits;

(b) converting the sensed motor voltage sine waves to square waves that are exactly in phase with the sensed motor voltages;

(c) processing and advancing the input square waves from step b to produce thyristor gate firing pulses that lead the motor voltage by 90 degrees;

(d) applying the thyristor gate firing pulses to the thyristors in a three-phase static switch which is in series with the motor input lines, and turning on the thyristors in sequence;

(e) prohibiting the application of thyristor gate firing pulses if an input power outage is detected;

(f) detecting a first coincidence of input source voltage and motor voltage zero crossing after the input power returns, and resuming the application of thyristor gate firing pulses to the thyristors in the three phase static switch; and

(g) controlling the switching of the three phase static switch to permit net positive power input to the motor, producing positive motor torque and therefore an acceleration of the motor to synchronism with the source power as quickly as possible.

4,931,716

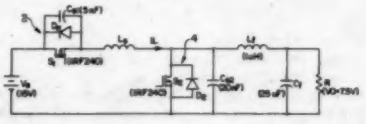
CONSTANT FREQUENCY ZERO-VOLTAGE-SWITCHING MULTI-RESONANT CONVERTER

Milan Jovanovic, 852 Hutcheson Dr., Blacksburg, Va. 24060; Richard Farrington, 310 Hillcrest Hall, Blacksburg, Va. 24061, and Fred C. Lee, 2909 Stradford La., Blacksburg, Va. 24060

Filed May 5, 1989, Ser. No. 347,853

Int. Cl.[5] G05F 1/46

U.S. Cl. 323—285 **11 Claims**



1. A constant frequency zero-voltage-switched resonant switch, comprising:

first switching means operative in open and closed circuit positions;

first resonant capacitor means in parallel with said first switching means;

second switching means in series with said first switching means, said second switching means being operative in open and closed circuit positions, said first and second switching means forming a closed loop;

second resonant capacitor means in parallel with said second switching means; and

inductor means inserted in said closed loop for forming a resonant circuit with said first and second resonant capacitor means;

wherein said first switching means is switched between said open and closed positions using a substantially constant frequency signal.

4,931,717

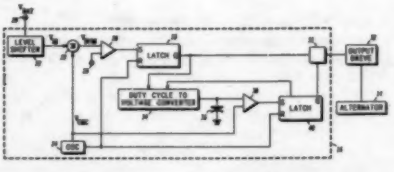
LOAD RESPONSE CONTROL AND METHOD

Randall C. Gray, and Robert Jarrett, both of Tempe, Ariz., assignors to Motorola Inc., Schaumburg, Ill.

Filed Sep. 5, 1989, Ser. No. 402,282

Int. Cl.[5] H02J 7/14

U.S. Cl. 323—299 **17 Claims**



1. A regulator responsive to an input signal proportional to the system supply voltage for controlling the output power of a alternator, comprising regulating means having an input

responsive to the input signal and an output for providing a pulse train wherein the duty cycle of the pulse train is inversely proportional to the amplitude of the input signal; output driving means coupled between the output of the regulating means and the alternator for controlling the current flowing therein at a level proportional to the duty cycle of the pulse train; oscillating means for providing first and second output signals wherein the period of the first and second output signals is less than the time constant of the current flowing in the alternator, wherein the improvement comprises means coupled between the output of the regulating means and the output driving means for limiting the rate of increase in the duty cycle of the pulse train applied thereto upon detecting a decrease in the system supply voltage by disabling the pulse train at a point in the cycle of the oscillating means which increases each cycle until reaching the particular duty cycle required to support the load such that the duty cycle of the pulse train is reduced during one cycle of the oscillating means upon detecting an increase in the system supply voltage.

4,931,718

CMOS VOLTAGE REFERENCE

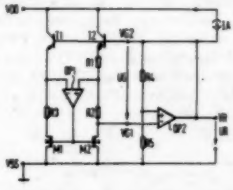
Heinz Zitta, Drobollach, Austria, assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Sep. 26, 1989, Ser. No. 412,894

Claims priority, application European Pat. Off., Sep. 26, 1988, 88115839.8

Int. Cl.[5] G05F *3/30*

U.S. Cl. 323—313 **5 Claims**



1. Circuit configuration in complementary MOS technology for generating a reference voltage independent of temperature with the aid of a bandgap circuit, comprising first and second bipolar transistors having output circuits, respective first and second base-to-emitter threshold voltages and interconnected base connections, a first resistor being connected to said first bipolar transistor and defining a first connecting point therebetween, second and third series-connected resistors defining a second connecting point therebetween, first and second field effect transistors having output circuits and drain connections, a supply voltage source having terminals, a first series circuit including said output circuit of said first bipolar transistor, said first resistor, and said output circuit of said first field effect transistor being connected between said terminals of said supply voltage source, a second series circuit parallel to said first series circuit including said output circuit of said second bipolar transistor, said series-connected second and third resistors, and said output circuit of said second field effect transistor, an operational amplifier having inputs connected to said first and second connecting points and an output controlling said field effect transistors, and a bandgap circuit having an output at said drain connection of said second field effect transistor being fed back to said base connections of said bipolar transistors.

4,931,719

HALL-EFFECT SENSOR ARRANGEMENT

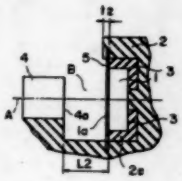
Shigemi Murata, and Yutaka Ohashi, both of Himeji, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 4, 1989, Ser. No. 389,468

Claims priority, application Japan, Aug. 5, 1988, 63-103201[U]

Int. Cl.[5] H03H *5/00*; F02P *3/00*

U.S. Cl. 323—368 **2 Claims**



1. A Hall-effect magnetic sensor arrangement comprising:

a magnetic sensor element utilizing the Hall-effect and disposed in a magnetic circuit including a magnetic pole unit in an opposing relationship with respect to said magnetic pole unit with a predetermined distance therebetween;

a sensor frame surrounding said sensor element and having a cave defined at the opposite side of said magnetic pole unit with respect to said sensor element and at a side perpendicular to a magnetic path;

a soft filler material filled in said cave for protecting said sensor element;

a nonmagnetic thin plate member disposed at the side of said sensor element opposite to said magnetic pole unit and supported at its outer edge by said sensor frame for preventing said filler material to flow out from said cave.

4,931,720

ARRANGEMENT FOR MEASURING TRANSFER IMPEDANCES OF COAXIAL CABLES

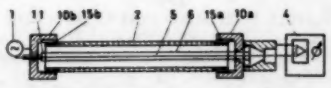
Heyno Garbe, Baden, and Diethard Hansen, Berikon, both of Switzerland, assignors to Asea Brown Boveri Ltd., Baden, Switzerland

Filed May 11, 1989, Ser. No. 350,204

Claims priority, application Switzerland, May 18, 1988, 1878/88

Int. Cl.[5] G01R *27/00*

U.S. Cl. 324—627 **7 Claims**



1. Arrangement for measuring transfer impedances of coaxial cables at higher frequencies, preferably beyond 30 MHz and up to 1 GHz, comprising:

a generator, which is connected via a coaxial supplying system to a conductor shield of a coaxial cable at a first end of the coaxial cable, and

a voltage measuring instrument which is connected at the first end between the conductor shield and the inner conductor of the coaxial cable,

wherein;

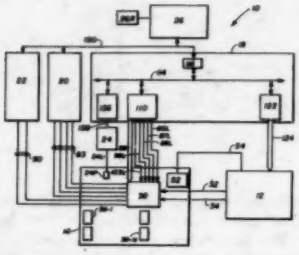
the electrical contact between the supplying system and the conductor shield is created by a gripping collet, and

the conductor shield and the inner conductor are short circuited at a second end of the coaxial cable.

4,931,721
DEVICE FOR AUTOMATICALLY ASCERTAINING CAPACITANCE, DISSIPATION FACTOR AND INSULATION RESISTANCE OF A PLURALITY OF CAPACITORS

Paul J. Berrigan, Circleville, Ohio, and Michael J. Brennan, Jr., Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Dec. 22, 1988, Ser. No. 288,495
Int. Cl.[5] G01R 27/26, 31/02
U.S. Cl. 324—658 **20 Claims**



1. Apparatus for automatically measuring various parameters of each of a plurality of capacitors comprising:

a predetermined number of test fixtures, each test fixture being adapted to receive one of the capacitors to be tested;

a plurality of measurement devices each operable to measure at least one predetermined parameter of a capacitor, one of the measurement devices being operative to measure the capacitance and the dissipation factor of the capacitor and a different one of the measurement devices being operative to measure the insulation resistance of the capacitor by measuring the leakage current of the capacitor at a predetermined applied DC electrical potential;

a relay matrix connected between the test fixtures and the plurality of measurement devices;

means for energizing predetermined combinations of relays in the relay matrix in accordance with a predetermined sequence thereby to connect predetermined ones of the test fixtures with predetermined ones of the measurement devices; and

control means for asserting the particular one of the measurement devices connected to the particular test fixture via the energized relays in the relay matrix to measure the predetermined parameter of the capacitor.

4,931,722
FLEXIBLE IMBEDDED TEST SYSTEM FOR VLSI CIRCUITS

Susana Stoica, Edina, Minn., assignor to Control Data Corporation, Minneapolis, Minn.

Continuation of Ser. No. 46,218, May 5, 1987, abandoned, which is a continuation-in-part of Ser. No. 796,047, Nov. 7, 1985, abandoned. This application Mar. 23, 1989, Ser. No. 327,938
Int. Cl.[5] G01R 31/28; G06F 11/00
U.S. Cl. 371—22.5 **38 Claims**

35. In a VLSI circuit having combinational logic, input pin means, and output pin means; an on-chip maintenance test system comprising:

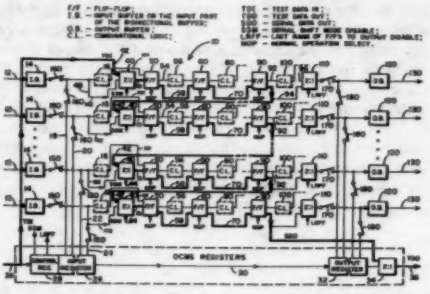
a control register having a plurality of outputs and having an input connected to an input pin,

an input register having pseudo-random number generating capabilities connected to said control register for input and having a plurality of outputs,

a set of memory elements having data and test inputs selectably enabled by a third input, and having at least one output, wherein the data and test inputs are selectably connected to receive output from said combinational logic or to receive output from another of said memory elements,

an output register connected in series to said input register and in parallel to said output pin means,

a first set of multiplexor means one of which has a first input connected to an off-chip test data input pin and the rest of



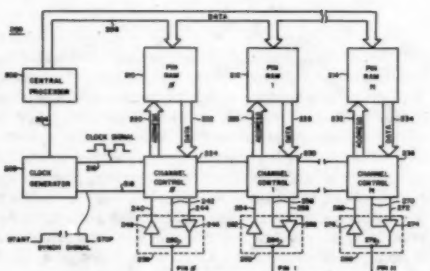
which receive their first input from said memory element outputs, all of which also have a second input and an output connected to the test input of said set of memory elements,

first switching means for selectively connecting said second input of said first set of multiplexor means between a set of said input pins and said input register.

4,931,723
AUTOMATIC TEST SYSTEM HAVING A "TRUE TESTER-PER-PIN" ARCHITECTURE

A. K. Jeffrey, Bournemouth; David J. Marsh, Ringwood, and Philip I. Collins, Verwood, all of England, assignors to Schlumberger Technologies, Inc., San Jose, Calif.

Continuation of Ser. No. 205,529, Jun. 9, 1988, abandoned, which is a continuation of Ser. No. 810,476, Dec. 18, 1985, abandoned. This application Dec. 22, 1988, Ser. No. 291,410
Int. Cl.[5] G01R 31/28; G01F 11/12
U.S. Cl. 371—22.3 **19 Claims**



6. A method for operating a multichannel tester for an electronic circuit in which each channel operates independent of all other channels having in each channel a test pin for contacting a test point of a unit under test a pin memory circuit storing test instructions which determine a state of operation of said test pin, and a channel control circuit coupled between said test pin and an output of said pin memory circuit, the method comprising:

programming a timer in said channel control circuit utilizing instructions appearing at said output of said pin memory

circuit to time a desired interval between a present state of operation of said test pin and a next state of operation of said pin;

cycling said pin memory circuit to a next address to a new test instruction for said next state of operation of said test pin at the termination of said interval.

4,931,724

DIGITAL LEVEL INDICATING DEVICE

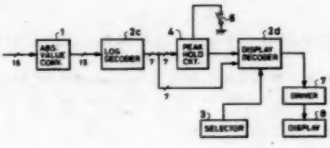
Shizuo Kakiuchi, and Hiroshi Iizuka, both of Saitama, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Division of Ser. No. 87,080, Aug. 19, 1987, Pat. No. 4,870,349. This application Jul. 21, 1989, Ser. No. 382,875

Claims priority, application Japan, Aug. 19, 1986, 61-195054; Aug. 19, 1986, 61-195055; Aug. 19, 1986, 61-195056; Aug. 19, 1986, 61-195058

Int. Cl.[5] **G01R** *19/16, 15/08*

U.S. Cl. 324—103 P **1 Claim**



1. A digital level indicating device, comprising:

a converter circuit for converting a digital signal applied thereto to an absolute value signal representative of an absolute value of said digital signal;

a first decoder for log-converting said absolute value signal;

a peak holder circuit for detecting and holding a peak of an output from said first decoder;

a second decoder for converting an output signal of said first decoder and a signal held by said peak holder circuit to an indicator signal;

indicator means for indicating a level of said digital signal in accordance with an output from said second decoder; and

selector means for switching choices of resolution of said second decoder.

4,931,725

ELECTRONIC ELECTRICITY METERS

Peter R. Hutt, and Stephen Day, both of Winchester, England, assignors to Polymeters Response International Limited, Winchester, England

Continuation of Ser. No. 790,620, Oct. 23, 1985, abandoned. This application Dec. 10, 1987, Ser. No. 131,061

Claims priority, application United Kingdom, Oct. 23, 1984, 8426822

Int. Cl.[5] **G01R** *21/06, 1/38*

U.S. Cl. 324—142 **10 Claims**

1. Electronic watt-hour electricity supply metering apparatus, comprising:

supply voltage sensing means for producing a first voltage representative of the supply voltage to the load, said first voltage being proportional to the magnitude of the fundamental frequency component of the supply voltage;

load current sensing means for producing a second voltage representative of the current supplied to the load, said second voltage being proportional to the amplitude of the fundamental frequency component of the load;

sampling circuits for deriving first and second signals related to said first and second voltages, respectively, said sampling circuits being extended in dynamic range by an error dispersion signal;

linear voltage amplification means for amplifying said first and second voltages;

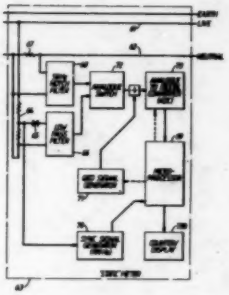
digital sampling means coupled to said linear voltage amplification means for producing said first and second signals and including an analog-to-digital converter;

voltage generation means for generating a third voltage;

voltage addition means for adding said third voltage to said first and second voltages, respectively, said third voltage being an alternating voltage without DC bias and cyclically varying with a peak-to-peak value equal to an integral number, at least equal to one, of a complete digitizing level of said analog-to-digital converter;

said analog-to-digital converter sampling the output signal of said voltage addition means and deriving said first and second signals;

said third voltage having a rectangular probability distribution and a frequency substantially different from the frequency of said supply voltage;



digital processor means controlling said analog-to-digital converter to effect samples of said output signal of said voltage addition means at a frequency equal to or less than twice the supply frequency and at the times of occurrence of the zero crossing and voltage peaks of said first voltage and at the peaks of said second voltage, and calculating therefrom the parameters relating to energy consumption of the load, the parameters being the apparent fundamental energy and apparent instantaneous fundamental power (VI), real fundamental energy and power (VI cos ϕ), or reactive fundamental energy and power (VI sin ϕ) supplied to the load.

4,931,726

APPARATUS FOR TESTING SEMICONDUCTOR DEVICE

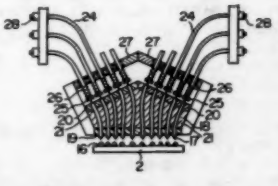
Susumu Kasukabe; Masasi Ookubo, both of Yokohama; Yutaka Akiba, Fujisawa; Minoru Tanaka, Yokohama, and Hitoshi Yokono, Toride, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jun. 21, 1988, Ser. No. 209,637

Claims priority, application Japan, Jun. 22, 1987, 62-153267; Jun. 30, 1987, 62-161332; Sep. 11, 1987, 62-226351

Int. Cl.[5] **G01R** *15/12, 31/00*

U.S. Cl. 324—158 F **10 Claims**



2. The semiconductor device testing apparatus according to claim 1, further comprising a third support plate for supporting

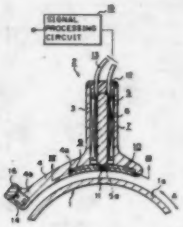
each of the plurality of springs and having a plurality of through-holes for passing said coaxial cables.

4,931,727

MOVING BODY SPEED DETECTING DEVICE WHICH PRODUCES AND DETECTS A MAGNETIC POLE ON THE BODY SURFACE

Kouichi Yamanoue; Shigeyuki Akita; Hiroaki Tanaka, all of Okazaki; Tatsuo Sugitani, Mishima, and Hideo Inoue, Kanagawa, all, Japan, assignors to Nippon Soken, Inc., Nishio and Toyota Jidosha Kabushiki Kaisha, Toyota, both of, Japan

Filed Oct. 18, 1988, Ser. No. 259,326
Claims priority, application Japan, Oct. 28, 1987, 62-272787
Int. Cl.[5] G01P *3/42;* B60T *8/32*
U.S. Cl. 324—172 13 Claims



1. A device for detecting a speed of movement of a moving body, a speed of which is to be measured, having a surface made of a magnetic material, comprising:

magnetizing means, disposed in the vicinity of said moving body, for forming a point magnetic pole on a surface of the moving body to move therewith,

magnetic field detecting means, provided adjacent to said moving body, for detecting a magnetic field of the magnetic pole formed on said surface by said magnetizing means, and producing a voltage in accordance with a variation of said magnetic field caused by the movement of said moving body, both said magnetizing means and said magnetic field detecting means being spaced from said moving body on a same straight line extending in a direction perpendicular to a direction of movement of said moving body; and

output signal processing means for processing a signal output by said magnetic field detecting means for determining the speed of movement of said moving body.

4,931,728

ROTATION DETECTING DEVICE HAVING A TERMINAL HOLDING ARRANGEMENT

Yasuaki Hata; Takeshi Yasukawa, and Masayoshi Onishi, all of Himeji, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 201,856, Jun. 3, 1988, Pat. No. 4,888,551.
This application Jun. 23, 1989, Ser. No. 371,559
Claims priority, application Japan, Jun. 4, 1987, 62-87050[U]; Jun. 4, 1987, 62-87051[U]; Jun. 4, 1987, 62-87049[U]
Int. Cl.[5] G01B *7/14;* H01F *15/10;* H01R *9/00;* G01P *3/488*
U.S. Cl. 324—207.15 2 Claims

1. A rotation detecting device comprising:

a pole formed of a ferromagnetic material;

a bias magnet for applying a magnetic flux to the pole;

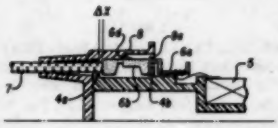
a bobbin receiving the pole and the bias magnet in a series arrangement;

a detecting coil mounted on the bobbin;

a pair of terminals each having a coil connecting part connected to a separate end of the wire of the coil and a lead wire connecting part connected to a separate lead wire, said terminals being received within said bobbin;

a cap which fits around said bobbin for covering the terminals and a portion of the bobbin holding the terminals;

fixing means for fixing the terminals to the bobbin, the fixing means being sawtooth ridges formed respectively in the outer surfaces of the terminals, and grooves formed in the



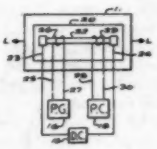
cap, capable of receiving the sawtooth ridges therein, respectively, the respective end surfaces of the grooves engaging the upright end surfaces of the sawtooth ridges, respectively, when the cap is put on the assembly of the bobbin and the terminals.

4,931,729

METHOD AND APPARATUS FOR MEASURING STRAIN OR FATIGUE

Norman F. Pratt, Scottsdale, Ariz., assignor to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Dec. 22, 1987, Ser. No. 136,268
Int. Cl.[5] G01B *7/24;* G01L *1/12;* G01R *33/14, 33/18*
U.S. Cl. 324—209 55 Claims



1. A strain gage comprising:

a ferromagnetic conductive element having a plurality of magnetic domains;

conductors attached to opposite ends of said ferromagnetic conductive element adapted for connection to a means for generating an electric biasing current;

means for initiating a changing magnetic field proximate to one end of said ferromagnetic conductive element, said magnetic field reversing the magnetic orientation of a majority of said plurality of magnetic domains, said means for initiating adapted for connection to an external power source;

means for producing a signal indicative of the reversing of said plurality of magnetic domains, said means proximate to said ferromagnetic conductive element, and

carrier means carrying at least said conductive element for securely positioning at least said conductive element, and for allowing attachment to a substrate.

44. A fatigue gage comprising:

a ferromagnetic conductive element having a plurality of magnetic domains;

conductors attached to opposite ends of said ferromagnetic conductive element adapted for connection to a means for generating an electric biasing current;

means for initiating a varying magnetic field proximate to one end of said ferromagnetic conductive element, said varying magnetic field causing the reversal of the magnetic orientation of said plurality of magnetic domains, said means for initiating adapted for connection to an external power source;

means for producing a signal indicative of the reversal of a majority of said magnetic domains, said means for produc-

ing a signal located proximate to said ferromagnetic conductive element, and spaced apart from said means for initiating; and

carrier means carrying at least said conductive element for securely positioning at least said conductive element, and for allowing attachment to a substrate.

4,931,730

METHOD AND APPARATUS FOR NON-DESTRUCTIVE MATERIALS TESTING AND MAGNETOSTRUCTURAL MATERIALS INVESTIGATIONS

Terje Olsen, Loddefjord; Nils C. Lekven, Os, and Julius Hartai, Drammen, all of Norway, assignors to Dam Patent A/S, Kokstad, Norway

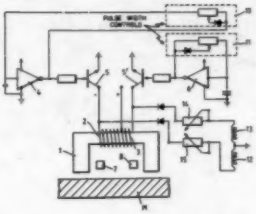
PCT No. PCT/NO87/00014, § 371 Date Oct. 15, 1987, § 102(e) Date Oct. 15, 1987, PCT Pub. No. WO87/05112, PCT Pub. Date Aug. 27, 1987

PCT Filed Feb. 16, 1987, Ser. No. 112,837

Claims priority, application Norway, Feb. 17, 1986, 860591

Int. Cl.[5] G01B *7/24;* G01N *27/80, 27/82;* G01R *33/12*

U.S. Cl. 324—209 **11 Claims**



1. A method for magnetostructural materials investigation and non-destructive materials testing of diamagnetic, paramagnetic, ferromagnetic and ferrimagnetic materials, comprising the steps of:

(a) generating an alternating magnetic field, the period of which is comprised of a first half-cycle being a magnetization pulse and a second half-cycle being a demagnetization pulse;

(b) regulating the pulse period of the alternating magnetic field such that the duration of the magnetization pulse is substantially larger than the duration of the demagnetization pulse, whereby the demagnetization pulse has a greater magnetic field strength than the magnetization pulse;

(c) placing the material to the investigated in the alternating magnetic field such that the material in the case of ferromagnetic or ferrimagnetic materials is magnetized and demagnetized and in the case of diamagnetic or paramagnetic materials is magnetically excited;

(d) measuring the counterinduction generated by the induction or the magnetic response of the material to be investigated; and

(e) recording the time dependence of the measured counterinduction.

4,931,731

MAGNETIC PARTICLE INSPECTION APPARATUS WITH ENHANCED UNIFORMITY OF MAGNETIZATION

William C. Jenks, 5225 Sapphire Ave., Alta Loma, Calif. 91701

Continuation of Ser. No. 141,071, Jan. 5, 1988, abandoned. This application May 8, 1989, Ser. No. 349,972

Int. Cl.[5] G01N *27/84;* G01R *33/12*

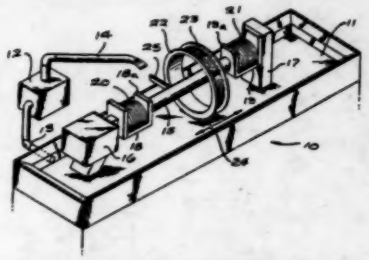
U.S. Cl. 324—216 **11 Claims**

1. A magnetic inspection system for detecting flaws in ferrous metal parts, comprising:

first means for passing a first pulsating direct current axially through a part to be inspected thereby generating a corresponding first magnetic field associated with said part;

second means for generating a second magnetic field generally orthogonal with respect to said first magnetic field, said second means including a pair of solenoid-wound first electromagnets adjacent to said part to be inspected, one of said first electromagnets being adjacent at each end of said part, said first electromagnets being energized by a second pulsating direct current;

third means comprising circuits connected from a three-phase alternating current source for supplying said first and second pulsating direct circuits, from first and second phases of said three-phase source, respectively, the pulses



of said first and second direct currents being phase displaced from each other because of the inherent phase relationship among the phases of said alternating current source;

fourth means associated with said third means for independently controlling the magnitudes and polarities of said first and second pulsating currents to achieve a predetermined balance between said first and second magnetic fields; and

fifth means for bathing said part to be inspected in a fluid vehicle containing finely powdered magnetizable particles, thereby to exhibit a characteristic visual pattern of said particles under the influence of said magnetic fields at the location of any flaw in said part.

4,931,732

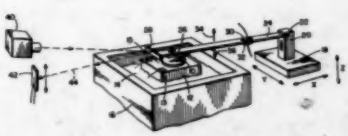
MAGNETIC FLEXURE SYSTEM FOR DETERMINING SUPERCONDUCTIVE PROPERTIES OF A SAMPLE

Francis C. Moon, Ithaca, N.Y., assignor to Cornell Research Foundation, Inc., Ithaca, N.Y.

Filed Jul. 25, 1988, Ser. No. 223,907

Int. Cl.[5] G01N *27/72;* G01R *33/12*

U.S. Cl. 324—228 **7 Claims**



1. A system for determining superconductive properties of a sample comprising:

means for measuring and adjusting the temperature of said sample to a point where said sample is expected to exhibit superconducting properties;

cantilever beam means for rigidly suspending magnet means at a point of non-contact proximity to said sample to cause said sample to generate a magnetic field if it is superconductive; and

means for measuring the movement of said cantilever beam means when said magnet means is in said non-contact proximity to said sample, said movement of said cantilever

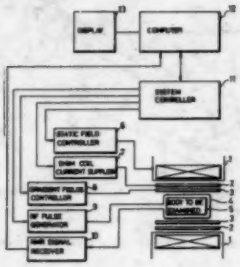
beam means being a measure of the interaction of said generated magnetic field with said magnetic means.

4,931,733

METHOD AND APPARATUS FOR DETERMINING SHIM COIL CURRENT IN NUCLEAR MAGNETIC RESONANCE IMAGING

Masatoshi Hanawa, Tochigi, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Dec. 2, 1988, Ser. No. 278,716
Claims priority, application Japan, Dec. 14, 1987, 62-314252
Int. Cl.[5] G01R *33/20*
U.S. Cl. 324—318 4 Claims



1. A nuclear magnetic resonance imaging apparatus, comprising:

magnet means for producing a static magnetic field;

probe coil means for irradiating radio frequency pulses on a body to be examined and for detecting nuclear magnetic resonance signals from the body;

shim coil means for adjusting the homogeneity of the static magnetic field by generating an extra magnetic field to be superposed on the static magnetic field; and

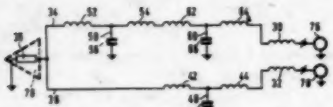
means for determining an amount of current to be supplied to the shim coil means in accordance with a nuclear magnetic resonance signal due to water by selecting a current for which a half-width of a nuclear magnetic resonance signal spectrum die to water is the smallest.

4,931,734

MAGNETIC RESONANCE APPARATUS HAVING A QUADRATURE RF COIL SYSTEM

Rudolf Kemner, and Hilco T. Kalmijn, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 11, 1989, Ser. No. 336,174
Claims priority, application Netherlands, Apr. 26, 1988, 8801079
Int. Cl.[5] G01R *33/20*
U.S. Cl. 324—318 9 Claims



1. In a magnetic resonance apparatus including a magnet system for generating a steady magnetic field, said magnet system comprising a radio-frequency coil system in which two coils are oriented to produce orthogonal magnetic fields in response to an applied radio-frequency signal, said coils being coupled in circuit with an electric switched circuit for generating and detecting magnetic resonance signals in a quadrature mode in accordance with the switched state of said circuit, impedance matching and signal delay means in circuit with said coils comprising:

a first branch coupled to one coil and a second branch coupled to the other coil, said branches being arranged to be selectively coupled to a radio- frequency signal source in one switch state and to magnetic field detection means in a second switch state; and

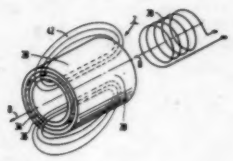
first and second inductance and capacitance means coupled to a respective different coil in a respective different branch, said first and second inductance and capacitance means for impedance matching said branches and for inducing a 90° phase delay of said applied radio-frequency signal propagating in each said branch.

4,931,735

SUPERCONDUCTIVE MAGNET SYSTEM COMPRISING SUPERCONDUCTIVE CYLINDERS

Johannes A. Overweg, and Paul B. Bunk, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, N.Y.

Filed May 2, 1989, Ser. No. 347,599
Claims priority, application Netherlands, May 4, 1988, 8801162
Int. Cl.[5] G01R *33/20*
U.S. Cl. 324—318 20 Claims



1. A magnetic resonance apparatus having a superconductive magnet system for generating a stationary magnetic field in a measuring space, comprising a magnetic field cylinder including at least one short-circuited ring of a superconductive material.

4,931,736

METHOD OF AND APPARATUS FOR MICROELECTRIC MEASURING OF INHOMOGENEITIES ON THE WALLS OF BOREHOLES FOR USE IN WELL LOGGING

Zoltán Barlai, Budapest; Géza Dorcsi, Szolnok; Ferenc Réz, Budapest, and Attila Vamos, Budakalász, all of Hungary, assignors to Magyar Allami Eotvos Lorand Geofizikai Intezet and Koolajkutato Vallat, Hungary, a part interest

Filed Mar. 28, 1988, Ser. No. 174,077
Claims priority, application Hungary, Apr. 13, 1987, 1630/87
Int. Cl.[5] G01V *3/20*
U.S. Cl. 324—367 31 Claims

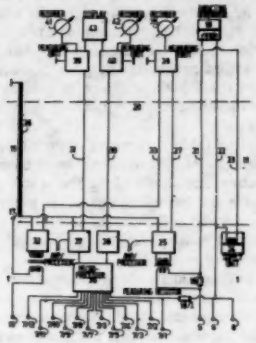
24. An apparatus for generating logs and images by measuring sharp local inhomogeneities a wall of formation pierced by a borehole, comprising:

(a) surface equipment including a current inducing generator for creating an electric field, a central control, arithmetic evaluating, graphic/photographic display unit and measuring units for determining the local inhomogeneities, and recorders for recording logs and images of the local inhomogeneities;

(b) a well logging cable connecting said surface equipment to a downhole tool;

(c) a downhole tool lowered in drilling mud in said borehole including conductive current electrodes connected to said current inducing generator for feeding conductive electrical currents into the rocks, measuring electrodes for measuring current intensities connected to an amplifier, a

signal processing-coding-coupling multiplexer unit for creating the ratios and place and direction coordinates from measured current intensities and transmitting them through the cable to the surface equipment, wherein said conductive current electrodes are arranged on insulating pads supported on said wall of said borehole by spring-



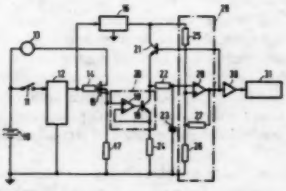
activated arms, whereby they are insulated from said drilling mud, said conductive current feeding the electrodes being capable of feeding current intensities perpendicularly to the wall of said borehole and wherein said parallel current intensities are measured by said measuring electrodes.

4,931,737

CIRCUIT FOR MEASURING THE CAPACITY OF A BATTERY

Teruo Hishiki, Tokyo, Japan, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 25, 1989, Ser. No. 343,116
Claims priority, application Japan, Jun. 14, 1988, 63-146109
Int. Cl.[5] G01N 27/26
U.S. Cl. 324—431 **11 Claims**



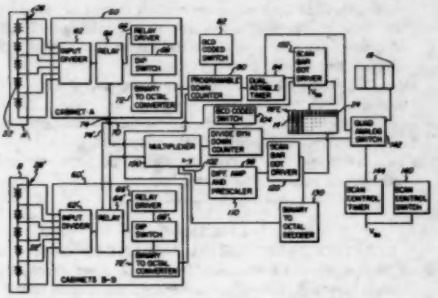
1. A circuit for measuring the energy capacity of a battery having a temperature characteristic such that the energy capacity of the battery varies as a given function of temperature, said measuring circuit comprising; detection means for detecting a current flowing through the battery, an integration circuit for integrating an output of the detection means, and means for measuring the capacitor of the battery in accordance with an output of the integration circuit, characterized in that said integration circuit includes a circuit element for determining an integration time constant, said circuit element having a temperature characteristic which substantially compensates for said temperature characteristic in the capacity of said battery.

4,931,738

BATTERY MONITORING SYSTEM OF CELL GROUPS AND DISPLAY

Hazen L. MacIntyre, Woodland Hills; Richard D. Graham, II, Acton, and Michael B. Aldava, Tehachapi, all of Calif., assignors to Kaufel Group, Ltd., Dorval, Canada

Filed Jan. 27, 1989, Ser. No. 303,452
Int. Cl.[5] G01N 27/46
U.S. Cl. 324—435 **19 Claims**



1. Battery monitoring apparatus for observing the charge condition of a plurality of battery cell groups, each cell group comprising at least one cell, comprising:

a display panel having a multiplicity of visual display means for providing a separate quantitative indication of the charge condition of each one of the plurality of cell groups being monitored and of the plurality of cell groups collectively;

means for driving the visual display means in response to a measured voltage potential related to the condition of each cell group to cause the visual display means to exhibit separate quantitative visual displays corresponding to the measured voltage potential of each cell group; and

means for coupling the driving means to plural cell groups;

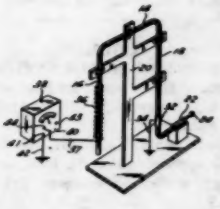
whereby the quantitative charge condition of a single cell group and of a plurality of cell groups may be individually determined by observation of said display panel to provide for diagnosis of cell group conditions for purposes of monitoring and replacement.

4,931,739

METER FOR MEASURING THE ELECTRIC CHARGE OF A BODY

Arthur H. MacLaren, 5 Alabaster, Irvine, Calif. 92714

Filed Feb. 3, 1989, Ser. No. 306,338
Int. Cl.[5] G01N 27/60; G01W 1/16
U.S. Cl. 324—452 **4 Claims**



1. Apparatus for measuring electric charge on a body such as the earth, independent of a reference comprising:

a dielectric tube supported in a substantially vertical position;

a reservoir containing a supply of conductive fluid, said tube

having an inverted U-shape with the lower end of one leg of the tube being open and with the lower end of the other leg of said tube being connected to said reservoir, said reservoir being located below the level of the open ended leg of the tube, and the open ended leg of the tube having a relatively small diameter such that conductive fluid will now flow out the open end of the tube so long as the other end of the tube is sealed to the reservoir;

a conductive coating located on a portion of the exterior of said tube at a location spaced from said reservoir;

means associated with said reservoir for raising or lowering the level of said fluid in the area of said coating by introducing or withdrawing a precisely measured quantity of fluid to and from the reservoir;

means for directly electrically connecting said fluid to said body;

an electrometer having a terminal connected to said coating and a terminal connected to said body; and

a switch for selectively short circuiting said terminals and connecting said coating to said body.

4,931,740

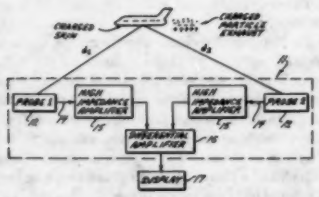
ELECTROSTATIC FIELD GRADIENT SENSOR

Reza Hassanzadeh, Chesterfield; Donald G. Funderburk, St. Charles; Steven A. Schwartz, University City, and Edward T. Rock, St. Louis, all of Mo., assignors to McDonnell Douglas Corporation, St. Louis, Mo.

Filed Aug. 2, 1988, Ser. No. 227,160

Int. Cl.[5] G05D *1/10*; G01P *3/42*; G01R *5/28*

U.S. Cl. 324—457 **21 Claims**



7. An apparatus for detecting the presence of a charge producing body moving in an electric field comprising means for sensing disturbances in an electric field caused by a charge bearing or charge producing body moving in said field, the sensing means including:

(a) means for sensing an electric field disturbance and for producing an output signal representing said disturbances, and

(b) means connected to said sensing means for processing the disturbance sensing means output to produce information constituting a characteristic signal of said body causing the disturbance and identifying said body.

4,931,741

BRANCHED SENSOR SYSTEM

Heinrich Koppitsch, Ottobrunn, Fed. Rep. of Germany, and Francis Sparling, Sunnyvale, Calif., assignors to Raychem Corporation, Menlo Park, Calif.

Continuation-in-part of Ser. No. 57,459, Jun. 3, 1987, Pat. No. 4,843,327. This application Dec. 20, 1988, Ser. No. 287,366

Claims priority, application European Pat. Off., May 31, 1988, 88304957.9

The portion of the term of this patent subsequent to May 30, 2006, has been disclaimed.

Int. Cl.[5] G01R *31/08*

U.S. Cl. 324—525 **14 Claims**

1. A sensor cable for use in detecting and obtaining information about an event, the cable comprising

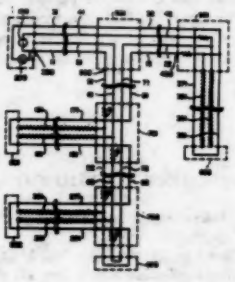
(1) a trunk line cable which follows an elongate trunk path having a near end and a far end; and

(2) at least one branch line cable which extends from the trunk line cable at an intermediate point along the trunk path and follows an elongate branch path from the intermediate point to a distant point;

the trunk line cable comprising first, second, third and fourth elongate electrically conductive members, each of the first and second members running along the whole length of the trunk path but being discontinuous at each intermediate point to provide an incoming end nearer to the near end of the trunk path and an outgoing end nearer to the far end of the trunk path, and each of the third and fourth members running continuously along the whole length of the trunk path;

the branch line cable comprising fifth, sixth, seventh and eighth elongate electrically conductive members, each of which runs continuously along the whole length of the branch path and has a first end at the intermediate point and a second end at the distant point;

each of the first ends of the fifth, sixth, seventh and eighth members being respectively connected to one of the incoming and outgoing ends of the first and second members, the second ends of the fifth and sixth members being respectively connected to the second ends of the seventh and eighth members, so that the incoming and outgoing ends of the first member are electrically connected to each



other through the branch line cable and the incoming and outgoing ends of the second member are electrically connected to each other through the branch line cable;

the first and second members being, in the absence of an event, insulated from each other and from other components of the trunk line cable along the length of the trunk line cable, except for said connections at each intermediate point, and optionally being such that upon occurrence of an event at a point along the trunk path, electrical connection is made between the first and second members at that point;

the third and fourth members being such that they are electrically insulated from each other and from other components of the trunk line cable along the whole length of the trunk line cable, both in the absence of an event and upon occurrence of an event;

the fifth and sixth members being, in the absence of an event, insulated from each other and from other components of the branch line cable along the length of the branch line cable, except for said connections at each intermediate point and distant point, and being such that upon occurrence of an event at a point along the branch path, electrical connection is made between the fifth and sixth members at that point; and

the seventh and eighth members being such that, both in the absence of an event and upon occurrence of an event, they are electrically insulated from each other and from other components of the branch line cable along the length of

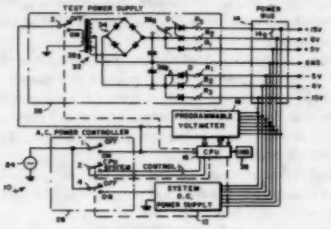
the branch line cable, except for said connections at each intermediate point and distant point.

4,931,742

SELF-PROTECTING POWER BUS TESTING SYSTEM

Karl Karash, Lowell, and Steen Bentzen, Berlin, both of Mass., assignors to GenRad, Inc., Concord, Mass.

Filed Mar. 22, 1989, Ser. No. 326,966
Int. Cl.[5] G01R 31/02
U.S. Cl. 324—541 7 Claims



1. An electrical system of the type that includes a power bus having a plurality of different conductive lines and a power supply for delivering a plurality of different supply voltages simultaneously to the different lines of the bus when the supply is turned on, the improvement comprising

means for applying a plurality of different test voltages simultaneously to said bus before the power supply is turned on, the test voltage applied to each line of the bus being a relatively small fraction of the supply voltage applied to that same line;

detecting means coupled to said bus for detecting low impedance paths in the bus upon application of the test voltages to the bus, said detecting means including means for comparing the voltages applied to the different lines of the bus by the test applying means with preselected test voltage limits and producing a said first output if all of the voltages on the lines are within their assigned limits and a said second output if all of the voltages on the lines are not within their assigned limits, and

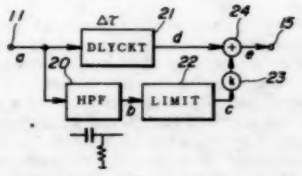
switch means responsive to said first output for interrupting the test voltage to the bus and turning on said power supply.

4,931,743

NOISE REDUCTION CIRCUIT

Hisatoshi Fukuda, and Hisashige Fujiwara, both of Yokohama, Japan, assignors to Victory Company of Japan, Ltd., Yokohama, Japan

Filed Jul. 10, 1987, Ser. No. 72,248
Claims priority, application Japan, Jul. 11, 1986, 61-163367
Int. Cl.[5] H04N 5/213; H03K 5/00
U.S. Cl. 328—167 12 Claims



1. A noise reduction circuit comprising;

first means for extracting a relatively high frequency component of an input signal and then amplitude-limiting a component of said extracted high frequency component exceeding a predetermined constant level,

second means for delaying said input signal by a predetermined time $\Delta\tau$, and

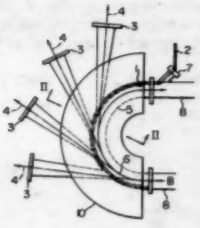
third means for adding an output signal of said first means and an output signal of said second means, and outputting an added result as an output signal of said noise reduction circuit.

4,931,744

SYNCHROTRON RADIATION SOURCE AND METHOD OF MAKING THE SAME

Tadasi Sonobe, Iwaki; Shinjiro Ueda, Abiko; Takashi Ikeguchi, Hitachi; Manabu Matsumoto, Higashiibaraki, and Kazuo Kuroishi, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi Service Engineering, Ltd., Ibaraki, both of, Japan

Filed Nov. 1, 1988, Ser. No. 265,702
Claims priority, application Japan, Nov. 2, 1987, 62-275753
Int. Cl.[5] H05H 13/04; H01J 9/00
U.S. Cl. 328—235 9 Claims



1. A synchrotron radiation source comprising:

a semi-circular charged particle beam bending section;

a semi-circular charged particle beam duct located inside said bending section and providing an orbital path for an orbiting charged particle beam, said charged particle beam duct having a beam absorber and a beam absorber cooling piping for cooling the beam absorber mounted therein;

a bending electromagnet, encompassing said charged particle beam duct, for generating a magnetic field which deflects the orbit of a charged particle beam inside said charged particle beam duct;

straight ducts connected to opposite ends of said charged particle beam duct; and

a piping guide duct fixed to at least one of said straight ducts and through which said beam absorber cooling piping can be drawn out of said synchrotron radiation source.

4,931,745

LOW NOISE CHOPPER STABILIZED AMPLIFIER AND METHOD OF OPERATION

Larry Goff, Dallas, Tex.; Lawrence A. King, Durham, N.C.; Daniel B. Barnett, and Samuel P. Justice, both of Garland, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

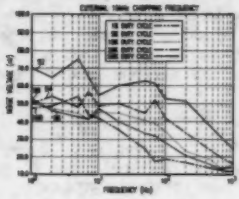
Filed Dec. 22, 1988, Ser. No. 288,503
Int. Cl.[5] H03F 1/02, 1/14
U.S. Cl. 330—9 27 Claims

1. A chopper stabilized amplifier cycling at a clock period, comprising:

a nulling amplifier;

a main amplifier associated with said nulling amplifier to form the chopper stabilized amplifier;

circuitry for generating a clock period including a first clock phase for correcting DC errors in said main amplifier, said



first clock phase having a duration less than 20% of the clock period.

4,931,746

CONTROLLABLE BROADBAND AMPLIFIER AND MIXER WHICH INCLUDES THE AMPLIFIER

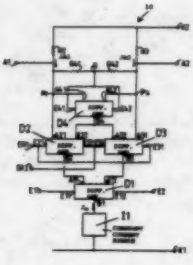
Günther Trinkle, Neu-Ulm Pfuhl, and Gottfried Deckenbach, Blaustein, both of Fed. Rep. of Germany, assignors to Licentia Patent-Verwaltungs-GmbH, Frankfurt, Fed. Rep. of Germany

Filed May 9, 1989, Ser. No. 352,546

Claims priority, application Fed. Rep. of Germany, May 11, 1988, 381075

Int. Cl.[5] H03F *3/45*; H04B *1/28*

U.S. Cl. 330—254 **15 Claims**



1. A controllable broadband amplifier for use with a power supply having first and second poles, the broadband amplifier having first and second signal input ports, first and second control voltage input ports, and first and second signal output ports, said broadband amplifier comprising:

an initial differential amplifier having first and second input ports, first and second output ports, and a shared port, the first input port of the initial differential amplifier being connected to the first signal input port of the broadband amplifier and the second input port of the initial differential amplifier being connected to the second signal input port of the broadband amplifier;

a constant current source connected between the shared port of the initial differential amplifier and the first pole of the power supply;

another differential amplifier having first and second input ports, first and second output ports, and a shared port, the first input port of the another differential amplifier being connected to the first control voltage input port of the broadband amplifier, the second input port of the another differential amplifier being connected to the second control voltage input port of the broadband amplifier, the shared port of the another differential amplifier being connected to the first output port of the initial differential amplifier, and the first output port of the another differential amplifier being connected to the first signal output port of the broadband amplifier;

an additional differential amplifier having first and second input ports, first and second output ports, and a shared port, and first input port of the additional differential amplifier being connected to the first control voltage input port of the broadband amplifier, the second input port of the additional differential amplifier being connected to the second control voltage input port of the broadband amplifier, the shared port of the additional differential amplifier being connected to the second output port of the initial differential amplifier, and the first output port of the additional differential amplifier being connected to the second signal output port of the broadband amplifier;

a further differential amplifier having first and second input ports, first and second output ports, and a shared port, the shared port of the further differential amplifier being connected to the second output port of the another differential amplifier and to the second output port of the additional differential amplifier;

a signal feed-out stage connecting the second pole of the power supply to the first and second signal output ports of the broadband amplifier; and

a plurality of impedance elements connected in series between the first and second signal output ports of the broadband amplifier, the series of impedance elements having a center tap at which the resistance between the first signal output port of the broadband amplifier and the center tap is substantially equal to the resistance between the second signal output port of the broadband amplifier and the center tap, the first and second input ports of the further differential amplifier being connected to the center tap.

4,931,747

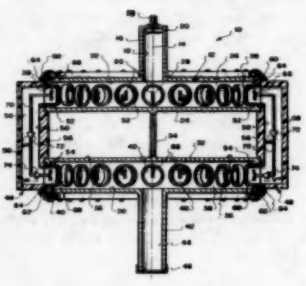
MICROWAVE POWER AMPLIFIER

Harvey K. Y. Hom, Santa Monica, Calif., assignor to Microwave Components and Systems, Inc., Westlake Village, Calif.

Filed May 30, 1989, Ser. No. 357,810

Int. Cl.[5] M03F *3/60*

U.S. Cl. 330—286 **11 Claims**



1. A microwave power amplifier comprising:

a tubular signal input chamber for receiving an input signal;

a signal divider chamber, said input chamber connecting with said signal divider chamber, said signal divider chamber being substantially cylindrical having a peripheral edge, said peripheral edge having a plurality of spaced apart signal exit openings;

a signal combiner chamber, said signal combiner chamber being spaced from said signal divider chamber, said signal combiner chamber being substantially cylindrical having a circumferential edge, said circumferential edge having a plurality of spaced apart signal inlet openings;

a tubular signal outlet chamber for transmitting into the ambient an outlet signal, said tubular signal outlet chamber connecting with said signal combiner chamber, said tubular signal outlet chamber adapted to collect the signals from said signal combiner chamber producing said outlet signal; and

a plurality of sockets, each said socket being removably connected between a single said exit opening and a single said inlet opening, each said socket including a power amplifying circuit, each said socket having an inner wall and an outer wall, both said inner wall and said outer wall being formed of a non-electrically conductive material.

4,931,748

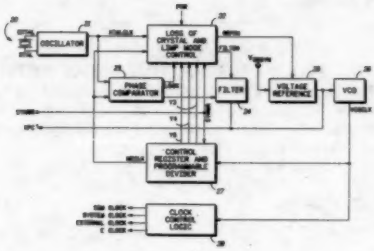
INTEGRATED CIRCUIT WITH CLOCK GENERATOR

Mark W. McDermott, and Antone L. Fourcroy, both of Austin, Tex., assignors to Motorola, Inc., Schamburg, Ill.

Continuation-in-part of Ser. No. 237,022, Aug. 26, 1988, abandoned. This application Jun. 9, 1989, Ser. No. 364,510

Int. Cl.[5] H03L 7/08

U.S. Cl. 331—1 A **28 Claims**



1. An integrated circuit comprising clock signal generator means for receiving a reference signal and for generating a clock signal of a first frequency, the generator means further comprising:

first means for detecting the loss of the reference signal and for producing a loss of signal output; and

second means coupled to receive the loss of signal output from the first means for generating a clock signal of a second frequency different from the first frequency in response to receipt of the loss of signal output.

4,931,749

PHASE LOCKED LOOP SWEEP FREQUENCY SYNTHESIZER

Nigel J. Walters, Horsham, England, assignor to U.S. Philips Corporation, New York, N.Y.

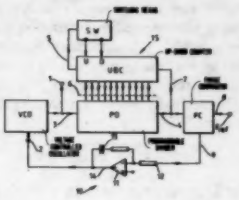
Filed Oct. 17, 1988, Ser. No. 258,404

Claims priority, application United Kingdom, Nov. 25, 1987, 8727564

Int. Cl.[5] H03B 23/00; H03L 7/12

U.S. Cl. 331—4 **6 Claims**

1. A frequency synthesizer of the phase lock loop type comprising a voltage-controlled oscillator (VCO) the output frequency of which forms the synthesizer output, a programmable frequency divider connected to the VCO output, which divider is arranged to divide the output frequency by a selectively variable integer N, control means for setting the value of N in the divider, a phase comparator having a first input connected to the output of the divider and a second input for connection to a reference frequency source, and a loop filter connected between the output of the phase comparator and a frequency control input of the VCO, whereby the output frequency is controlled to equal the Nth multiple of the reference frequency, characterized in that the output of the divider is connected to the control means, in that the control means comprise means for incrementing or decrementing N by a predetermined value at each periodic time of the divider output, and in that the loop filter comprises an integrator,



whereby the output frequency is controlled to sweep at a substantially linear rate.

4,931,750

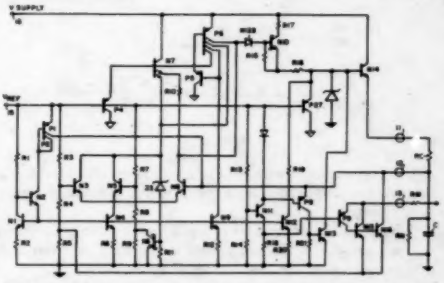
VOLTAGE CONTROLLED OSCILLATOR

Walter S. Goatowski, Thompson, Conn., assignor to Cherry Semiconductor Corporation, East Greenwich, R.I.

Filed May 25, 1989, Ser. No. 356,936

Int. Cl.[5] H03K 3/26

U.S. Cl. 331—111 **9 Claims**



1. A wide range voltage controlled oscillator comprising:

a timing capacitor;

means for selectively charging said capacitor;

a voltage controlled current source for discharging said capacitor at a rate which is a function of an externally supplied control voltage;

current bias circuitry including at least two transistors whose bases are connected together and whose emitters are provided with respective current value determining resistors, said bias circuitry including also means for applying a preselected current to the collector of a first one of said two transistors thereby to establish a corresponding current at the collector of a second one of said transistors;

a differential, emitter-follower input circuit for controlling said charging means, said input circuit including at least two transistors which are similar in type to said bias circuitry transistors, the emitters of said input circuit transistors being connected in common to the collector of said second one of said current bias transistors, the base of one of said input circuit transistors being connected to a reference voltage source and the base of the other of said input transistors being connected to said capacitor;

a buffer transistor similar in type to said bias circuitry transistors, the base of said buffer transistor being connected to the collector of said first bias circuit transistor and the emitter of said buffer transistor being connected to the base terminals of said first and second bias circuit transistors for applying bias current thereto whereby the collector current in said buffer transistor is proportional to the

collector currents in said first and second input circuit transistors and inversely proportional to their gains; and

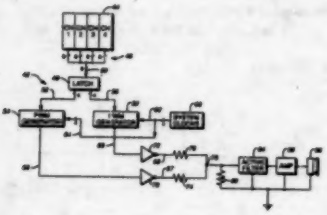
current mirror means having an input connected to the collector of said buffer transistor and an output connected to the base of said second input circuit transistor thereby to provide to said second input transistor a compensated bias current which prevents said capacitor from being discharged by the base current drawn by said second input transistor, whereby the discharging of said capacitor is controlled essentially solely by said voltage controlled current source.

4,931,751

APPARATUS AND METHOD FOR PRODUCING PULSE WIDTH MODULATED SIGNALS FROM DIGITAL INFORMATION

Glenn J. Keller, Los Gatos, and Javier A. Solis, Santa Clara, both of Calif., assignors to Epyx, Inc., Redwood City, Calif.

Filed Jan. 2, 1989, Ser. No. 360,333
Int. Cl.[5] H03K 7/08, 7/10
U.S. Cl. 332—108 **32 Claims**



1. An apparatus, responsive to a multiple bit sample of digital information, for producing a pulse width modulated signal, comprising:

first means, responsive to a first subset of the multiple bit sample, for producing a first signal that can transition between first and second logical states;

second means, responsive to a second subset of the multiple bit sample, for producing a second signal that can transition between the first and second logical states; and

third means for producing a first voltage that is substantially proportional to a magnitude of the first signal in one of the first logical state and the second logical state and for producing a second voltage that is substantially proportional to a magnitude of the second signal in one of the first logical state and the second logical state and for producing an output voltage that is substantially proportional to a sum of the first voltage and the second voltage.

4,931,752

POLYIMIDE DAMPER FOR SURFACE ACOUSTIC WAVE DEVICE

Robert C. Bray; Catherine A. Johnsen, both of Santa Rosa; Timothy L. Bagwell, Rohnert Park, and Waguih S. Ishak, Cupertino, all of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Sep. 30, 1987, Ser. No. 103,559
Int. Cl.[5] H03H 9/09; B05D 3/06
U.S. Cl. 333—151 **31 Claims**

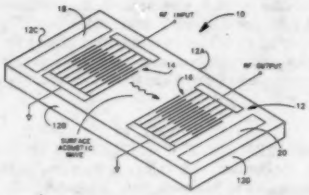
1. A surface acoustic wave (SAW) device comprising:

piezoelectric means having end and side edges;

an input transducer in contact with the piezoelectric means for launching acoustic surface waves along a propagation path on the piezoelectric means in response to input electrical signals;

an output transducer in contact with the piezoelectric means across the propagation path from the input transducer and responsive to surface waves generated by the input transducer for generating output electrical signals corresponding to the received surface waves; and

an acoustic energy absorbing polyimide area formed on the surface of the piezoelectric means between the input transducer and an edge of the piezoelectric means adjacent the



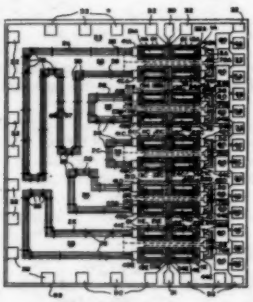
input transducer, the acoustic energy absorbing polyimide area having a sound attenuation constant greater than 30 dB per centimeter at 300 megahertz and stable and without gaseous discharge at temperatures about 180 degrees Centigrade.

4,931,753

COPLANAR WAVEGUIDE TIME DELAY SHIFTER

William W. Nelson, Palo Alto; Camille A. Lesko, Scotts Valley; Andrew M. Kennedy, II, Oakland, and Vernon E. Dunn, Milpitas, all of Calif., assignors to Ford Aerospace Corporation, Newport Beach, Calif.

Filed Jan. 17, 1989, Ser. No. 297,230
Int. Cl.[5] H01P 1/18, 3/08
U.S. Cl. 333—161 **4 Claims**



1. A time delay shifter for imparting a constant time delay to an electromagnetic signal, comprising at least one delay unit consisting of first through fourth switching elements; wherein:

each switching element generates a capacitance when said switching element is not closed;

closure of the first and third switching elements causes the signal to traverse a first path containing a preselected length of transmission line that imparts a fixed time delay to the signal;

closure of the second and fourth switching elements causes the signal to traverse a second path shorter than the first path;

the paths are fabricated of coplanar waveguide, each comprising a thin center conductor lying on a planar dielectric substrate, said center conductor being straddled on two sides by coplanar electrically conductive ground plane material separated from said center conductor by two substantially equally wide air gaps;

an inductor is positioned in the vicinity of each switching element, said inductor having an inductance which has been preselected to create, at the center frequency of

operation, resonance with the capacitance generated by said switching element when said switching element is not closed; and

each inductor comprises a conductive element, generally in the shape of a spiral, positioned over the switching element and elevated from the dielectric substrate by a plurality of conductive posts.

4,931,754

FILTER UNIT FOR CONNECTORS HAVING FILTER CAPACITORS FORMED ON OPPOSING SURFACES OF A SUBSTRATE

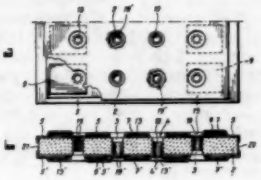
Bob Moussie, Berlicum, Netherlands, assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jun. 24, 1988, Ser. No. 211,253

Claims priority, application Netherlands, Jul. 14, 1987, 8701661

Int. Cl.[5] H01R *13/648*

U.S. Cl. 333—184 **19 Claims**



4. A filter unit for a connector having one or more contact elements, comprising a substrate of electrically insulating material which has two flat sides lying opposite each other joined by narrow edges and is provided with passages having connecting walls between said flat sides for the contact elements of the connector, capacitors being disposed on one flat side of the substrate in the region of one or more of the passages, said capacitors being made up of first electrodes formed by at least one layer of electrically conducting material which extends over said one flat side of the substrate and is provided with correspondingly situated electrode passages which are larger than the passages of said substrate, second electrodes formed by spaced-apart electrode patches of electrically conducting material which cover said passages of said substrate and can be connected to the contact elements of the connector, and at least one layer of dielectric material extending between the first and second electrodes in such a way that the passages of said substrate are open, the filter unit further comprising capacitors disposed on the other opposite flat side of the substrate in the region of one or more of the passages, said capacitors on the opposite side having first and second electrodes constructed similar to corresponding first and second electrodes of said capacitors on the one side, wherein the electrode patches situated on both sides of the substrate are arranged in such a way that any particular passage is surrounded by an electrode patch on only one of the flat sides of the substrate.

4,931,755

SURFACE-ACOUSTIC-WAVE DEVICE WITH A CAPACITANCE COUPLED BETWEEN INPUT AND OUTPUT

Nobuyoshi Sakamoto, and Ou H. Huor, both of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Nov. 21, 1988, Ser. No. 275,406

Claims priority, application Japan, Nov. 20, 1987, 62-291972; Jun. 17, 1988, 63-79541

Int. Cl.[5] H03H *9/64*

U.S. Cl. 333—193 **4 Claims**

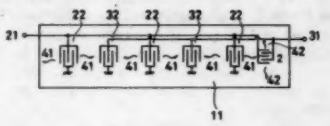
1. A surface-acoustic-wave device, comprising:

an input lead;

an output lead;

a surface-acoustic-wave filter connected between said input lead and said output lead, said surface-acoustic-wave filter comprising a piezoelectric substrate;

a plurality of first interdigital transducers disposed in a row on the surface of said piezoelectric substrate, adjacent ones of said first interdigital transducers connected alternately to said input lead and said output lead;



capacitance means connected between said input lead and said output lead in parallel with said surface-acoustic-wave filter; said capacitance means comprising a further interdigital transducer disposed on said piezoelectric susbtrate; and wherein said first interdigital transducers and said further interdigital transducer each generate surface acoustic waves which are of different wavelengths from each other.

4,931,756

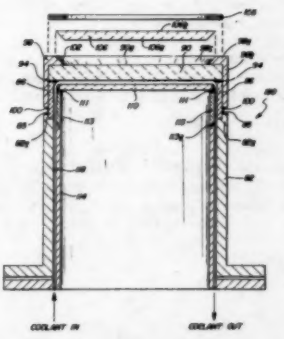
HIGH POWER MICROWAVE TRANSMISSIVE WINDOW ASSEMBLY

Joachim Doehler, Union Lake; Buddie Dotter, II, Utica; Jeffrey M. Krisko, Highland, and Lester R. Peedin, Oak Park, all of Mich., assignors to Energy Conversion Devices, Inc., Troy, Mich.

Filed Apr. 8, 1988, Ser. No. 179,617

Int. Cl.[5] H01P *1/08*

U.S. Cl. 333—252 **33 Claims**



1. A window assembly for transmitting high power microwave energy from microwave propagating means, maintained at substantially atmospheric pressure, into the interior of a chamber maintained at sub-atmospheric pressure; said window assembly comprising:

dielectric means substantially transparent to microwave energy through which microwave energy is transmitted from said propagating means into the interior of said chamber, said dielectric means having a relatively high coefficient of thermal conductivity, said dielectric means including at least a first, a second and a third spacedly disposed, concentrically oriented generally planar windows formed of a dielectric material;

vacuum sealing means cooperating with said dielectric means for maintaining the pressure differential between the chamber and the propagating means; and

means for cooling said dielectric means and said sealing

means as high power microwave energy is transmitted through said dielectric means, said cooling means adapted to maintain said dielectric means and said sealing means at a sufficiently low temperature to prevent overheating of said sealing means and cracking of said dielectric means.

4,931,757

CONTACTOR AND/OR CIRCUIT BREAKER

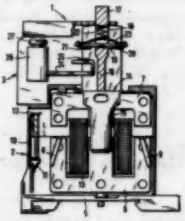
Helmut Lemmer, Marienheide, and Josef Risthaus, Gummersbach, both of Fed. Rep. of Germany, assignors to Square D Starkstrom GmbH, Fed. Rep. of Germany

Filed Nov. 17, 1988, Ser. No. 272,289

Claims priority, application European Pat. Off., Nov. 25, 1987, 87117364.7

Int. Cl.[5] H01H 67/02

U.S. Cl. 335—131 30 Claims



1. A contactor comprising a first plurality of contact means (20, 21, 25, 28) for selectively opening and closing an electric circuit and a second plurality of additional contact means (34, 76 and 46, 47) for each electrical phase and a coil connection of a coil (13) of an associated magnetic system, respectively; thermal trippers (73) and magnetic trippers (49) for each phase, and actuation means (48, 54, 62, 70, 93) selectively operable by the tripping of one of said thermal trippers (73) and said magnetic trippers (49) for moving said second plurality of additional contact means (34, 76 and 46, 47) from closed to open positions thereof to open the associated electric circuit.

4,931,758

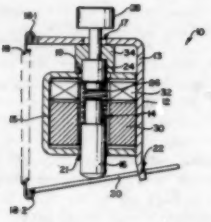
ELECTRO-MAGNETIC SHUNT TRIP DEVICE

Dante Bagalini, Johannesburg, South Africa, assignor to Circuit Breaker Industries Limited, Eland Sfontein, South Africa

Filed Dec. 9, 1988, Ser. No. 282,438

Int. Cl.[5] H01H 9/00

U.S. Cl. 335—174 8 Claims



1. An electro-magnetic shunt trip device, which includes

a first member that is of ferro-magnetic material and which is slidably displaceable between a normal position and a tripped position;

a first urging means for urging the first member towards its normal position;

a second member that is also of a ferro-magnetic material and which is slidably displaceable towards and away from the first member, the second member being manually displaceable towards and at least into close proximity to the first member;

a second urging means for urging the first and second member away from one another with movement of the first member away from the second member being towards its tripped position;

a first stop means for limiting movement of the second member away from the first member;

a second stop means for limiting movement of the first member away from the second member;

a magnetic path defining means for defining a magnetic path which passes through both the first and second members;

a first magnetic field generating means for generating a magnetic field in the magnetic path; and

an electrically operable second magnetic field generating means for generating a magnetic field which is of reverse polarity to the field generated by the first magnetic field generating means, with the first and second magnetic field generating means being operable such that in use, the magnetic field generated by only the first magnetic field generating means is sufficiently strong to hold the first and second members together when the second member is displaced into at least sufficiently close proximity with the first member, against the forces exerted on the first and second members by the second urging means, and the net magnetic field resulting from the first and second magnetic fields is not sufficiently strong to hold the first and second members together.

4,931,759

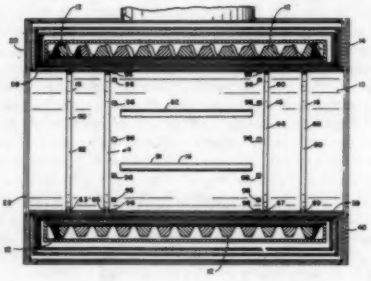
MAGNETIC RESONANCE IMAGING MAGNET HAVING MINIMALLY SYMMETRIC FERROMAGNETIC SHIELD

Bruce C. Breneman; John R. Purcell, and Raymond E. Sarwinski, all of San Diego, Calif., assignors to General Atomics

Filed Apr. 6, 1989, Ser. No. 334,291

Int. Cl.[5] H01F 7/00

U.S. Cl. 335—301 7 Claims



1. A magnet for a magnetic resonance imaging apparatus comprising:

means for producing a magnetic field in an examination region;

a minimally symmetric magnetic shield partially enclosing the magnetic field producing means and providing a magnetic flux return path for reducing a magnetic field intensity external to the magnetic field producing means; and

compensation means for compensating for perturbations of the magnetic field within the examination region caused by the minimally symmetric magnetic shield, the compensation means comprising a first symmetric compensating ring positioned at a first end of the examination region and a second symmetric compensating ring positioned at a second end of the examination region, the first symmetric

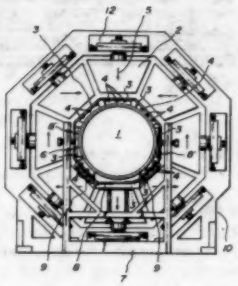
compensating ring and the second symmetric compensating ring reducing zonal inhomogeneities in the magnetic field within the examination region, said compensation means further comprising a third symmetric compensating ring positioned at the first end of the examination region and a fourth symmetric compensating ring positioned at the second end of the examination region, the third symmetric compensating ring and the fourth symmetric compensating ring further reducing zonal inhomogeneities in the magnetic field in the examination region.

4,931,760

UNIFORM MAGNETIC FIELD GENERATOR

Junji Yamaguchi, Shimoogino, and Terumasa Yamasaki, Samejima, both of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Sep. 14, 1987, Ser. No. 95,988
Claims priority, application Japan, Oct. 8, 1986, 61-238136
Int. Cl.[5] H01F 7/02
U.S. Cl. 335—306 17 Claims



1. A uniform magnetic field generator comprising:
means for generating a static magnetic field; and
means for regulating a uniformity of said static magnetic field;
said generating means being an annular permanent magnet comprising a plurality of permanent magnet blocks arranged annularly;
said regulating means comprising a plurality of adjustably positioned permanent magnet pieces, said plurality of adjustably positioned permanent magnet pieces positionable relative to said generating means in said static magnetic field for regulating the uniformity of said magnetic field, said regulating means further comprising a non-magnetic hold plate for holding said plurality of adustably positioned permanent magnetic pieces in said static magnetic field.

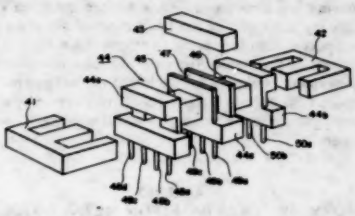
4,931,761

COMPACT TRANSFORMER

Seiichi Kijima, Tokyo, Japan, assignor to Kijima Co., Ltd., Tokyo, Japan

Filed Feb. 28, 1989, Ser. No. 317,195
Claims priority, application Japan, Mar. 8, 1988, 63-52747
Int. Cl.[5] H01F 27/26, 27/30
U.S. Cl. 336—160 2 Claims

1. A compact transformer comprising a bobbin having a square tubular portion serving as a coil carrier provided at opposite ends with respective end flanges and at middle with an intermediate flange, these flanges being formed integrally with said square tubular portion, said intermediate flange including a channel in communication with the interior of said square tubular portion to receive one of core elements; a first coil wound around said square tubular portion along a first coil carrying section defined between one of said end flanges and the intermediate flange and a second coil carrying section defined between the other of said end flanges and the intermediate flange; and a core consisting of two core elements partially inserted into the interior of said square tubular portion of the bobbin from the exterior through the respective end flanges and another core element inserted into said channel formed in said intermediate flange of the bobbin.

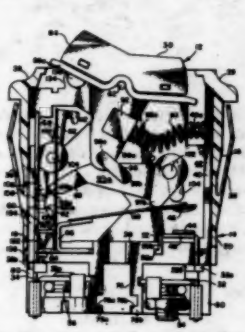


4,931,762

CIRCUIT BREAKER CONSTRUCTION

Joseph Fierro, Trenton, N.J., assignor to Heinemann Electric Company, Lawrenceville, N.J.

Filed Apr. 13, 1989, Ser. No. 337,578
Int. Cl.[5] H01H 71/16
U.S. Cl. 337—66 17 Claims



1. A breaker construction comprising:
a support frame;
at least a pair of terminals supported on the supporting frame, one of which is connected directly to a breaker switch contact, the other of which is connected through an overload actuator element to a second contact on a movable arm;
a handle pivotally supported on the frame and providing a linkage crank arm;
a main spring between the frame and the handle to urge the structure into open contact position;
a rocker supported to the frame only by a pin transversely movable in a guide means on the frame and provided with a surface which bears against the movable switch arm to close the switch contact;
a linkage member connecting the linkage crank arm to the rocker by pins permitting relative rotation parallel to the handle pin, whereby movement of the handle will cause movement of the rocker into the movable arm contact support to close the contacts, the linkage pin connected to the crank arm moving over center compared to the other linkage pin and the handle pin to stably hold the switch in closed contact condition with the handle linkage stopped by the support frame; and

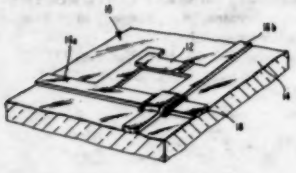
a latch lever pivotally supported on the frame having a latch spring extending between the latch and the frame to urge the latch into the rocker and permit latch engagement therebetween so that a latching surface of the latch lever can support the rocker in closed contact position and having a member engageable by the overload element moving a portion of the latch element about its pivotal support against the spring to release the rocker, whereby release of the rocker from the latch by overload allows movement of the rocker such that the linkage pin which moved over center is moved back over center by the main spring to cause the rocker to allow the movable contact to open.

4,931,763

MEMORY SWITCHES BASED ON METAL OXIDE THIN FILMS

Rajeshuni Ramesham; Anilkumar P. Thakoor, both of Pasadena, Calif., and John J. Lambe, Redmond, Wash., assignors to California Institute of Technology, Pasadena, Calif.

Filed Feb. 16, 1988, Ser. No. 157,318
Int. Cl.[5] H01C 7/10, 1/012
U.S. Cl. 338—22 SD 10 Claims



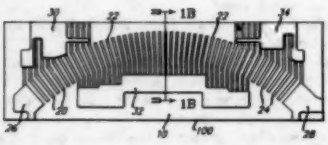
1. An irreversible memory switch (10) comprising a thin film (12) of a metal oxide system capable of exhibiting an OFF/ON resistance ratio of at least about 10^3 upon application of at least one of a suitable electrical pulse or a suitable elevated temperature, said metal oxide system comprising a metal oxide of a first composition having a deposition-dependent resistivity which may be converted to a metal oxide of a second composition having a resistivity much higher than that of said first composition.

4,931,764

LOW WEAR RESISTOR CARD FOR USE IN A LIQUID FUEL SENDER CIRCUIT

Robert D. Gaston, Dearborn Heights, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Dec. 27, 1988, Ser. No. 290,011
Int. Cl.[5] H01C 10/46
U.S. Cl. 338—185 5 Claims



1. A resistor card for use in a liquid fuel sender circuit that contains a float controlled electrical wiper contact, comprising:

a substrate containing a plurality of metalized depositions in a predetermined pattern of electrically isolated areas resistively connected in series and said metalized depositions containing portions that correspond to the sweep pattern of the float controlled electrical wiper contact; and

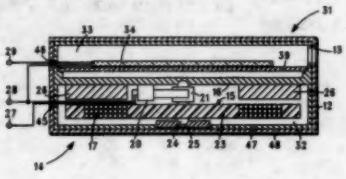
a coating of thick film resistor material deposited on said portions of metallized depositions that correspond to said sweep pattern of said float controlled electrical wiper contact.

4,931,765

UNITIZED HOUSING FOR SILENT AND TONE PAGER ALERTING SYSTEM

Thomas J. Rollins, Boca Raton; Charles W. Mooney, Lake Worth, and Tuan K. Nguyen, Boca Raton, all of Fla., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Feb. 9, 1989, Ser. No. 308,288
Int. Cl.[5] G08B 5/00
U.S. Cl. 340—407 27 Claims



1. An electrical component, comprising:

a housing defining a first chamber, said first chamber having a wall;

a low profile vibrating motor located in said first chamber, said low profile vibrating motor selectively providing a substantially silent vibration to said housing;

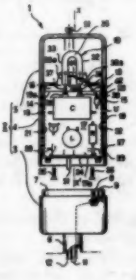
a tone generator contiguous to said wall, said wall interposed between said first chamber and said tone generator, said housing having a first port therein for providing power to said low profile vibrating motor.

4,931,766

OPTICAL SIGNALLING DEVICE OF THE LUMINOUS TUBE TYPE

Jacques Bernard, Angouleme, and Dominique Charrier, St-Amand de Boixe, both of France, assignors to La Telemecanique Electrique, Nanterre Cedex, France

Filed Feb. 21, 1989, Ser. No. 313,365
Claims priority, application France, Feb. 24, 1988, 88 02224
Int. Cl.[5] G08B 5/00
U.S. Cl. 340—332 5 Claims



1. An optical signalling device having a partially transparent envelope (2), a substantially U-shaped luminous tube (10) containing a gaseous atmosphere being placed within said enve-

lope and supplied by a capacitor (C) which is charged and discharged by means of electric circuits placed on a printed circuit card wherein, within an insulating casing (4) having an end-wall (13) and side walls (14, 15), there is placed and maintained said printed circuit card (17) which carries conductive tracks (38, 39) soldered directly to the supply terminals (36, 37) of the gas tube (10), said gas tube being placed in a plane substantially parallel to a longitudinal axis of the casing (4) and having two portions (32*a*, 33*a*) adjacent to the ends of its arms (32, 33) which are securely clamped between two resilient lips (44, 45) forming part of the end-wall (13) through which they pass, whilst the bent region (35) of said tube extends externally of said end-wall and is protected by a transparent cover (5) of the envelope (2).

4,931,767

DEVICE FOR VISIBILITY MEASUREMENT FOR A MOTOR VEHICLE

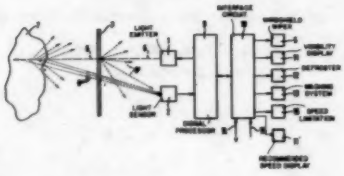
Hans Albrecht, Waiblingen; Siegfried Reiniger, Deizsau; Wolfgang Lauer, Esslingen; Hans Spies, Pfaffenhofen; Horst Laucht, Bruckmühl, and Martin Spies, Pfaffenhofen, all of Fed. Rep. of Germany, assignors to Daimler-Benz AG, Stuttgart, Fed. Rep. of Germany

Filed Oct. 17, 1988, Ser. No. 258,465

Claims priority, application Fed. Rep. of Germany, Oct. 17, 1987, 3735267

Int. Cl.[5] **G01N** *21/00*

U.S. Cl. 340—425.5 **15 Claims**



1. Device for visibility measurement for a motor vehicle with a drivers compartment bounded by a windshield, comprising:

a light emitter means for generating light pulses or flashes,

a light sensor for registering the light scattered back from scatter zones in the light path upon emission of the light pulses or flashes; and

an evaluation circuit for converting output signals of the light sensor into control signals for a visibility display,

wherein both light backscatter from scatter zones outside the windscreen of the driver's compartment and the light backscatter caused by soiling on the windshield can be evaluated by virtue of the fact that the light emitter means and the light sensor are arranged inside the windshield and the light pulses or flashes are directed onto the windshield and through the windshield to the outside; and

wherein the light emitter means and the light sensor are arranged on a rear view mirror inside the driver's compartment.

4,931,768

MULTICOLOR EMERGENCY VEHICLE LIGHT

Danny C. Jincks, Annapolis, and Michael D. Latta, St. Louis, both of Mo., assignors to Public Safety Equipment, Inc., St. Louis, Mo.

Filed Aug. 1, 1988, Ser. No. 227,065

Int. Cl.[5] **B60Q** *7/00*; **B61L** *29/24*

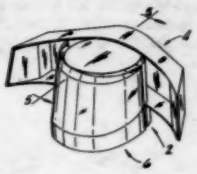
U.S. Cl. 340—473 **52 Claims**

27. An emergency vehicle light comprising:

a base adapted to be mounted on a vehicle;

a light source on the base adapted to emit a beam of light;

lens means on the base for enclosing the light source, said lens means having a front portion and a rear portion;



filter means external to and releasably mounted on the front portion of the lens means for filtering the light beam as it passes through the front portion of the lens means.

4,931,769

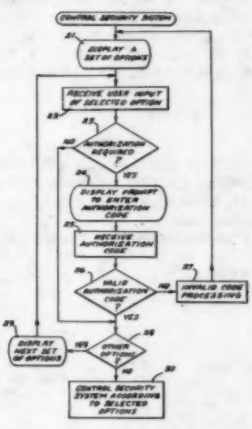
METHOD AND APPARATUS FOR CONTROLLING THE OPERATION OF A SECURITY SYSTEM

Kirk B. Phillips, Wilkesboro, and Peter Kastan, Hickory, both of N.C., assignors to Moose Products, Inc., Hickory, N.C.

Filed Nov. 14, 1988, Ser. No. 271,009

Int. Cl.[5] **G08B** *13/00*

U.S. Cl. 340—541 **26 Claims**



1. A method of controlling the operation of a zone monitoring security system for monitoring at least one zone for at least one of physical intrusion anD fire, comprising the steps of:

displaying to a user on a display device, a first set of alternative options for controlling the zone monitoring security system for monitoring at least one zone for at least one of physical intrusion and fire;

receiving user input of a selected one of said first set of alternative options;

in response to said user input, displaying a prompt to enter an authorization code;

receiving user input of an authorization code;

checking the validity of the received authorization code; and

in response to user input of a valid authorization code, controlling the zone monitoring security system for monitoring at least one zone for at least one of physical intrusion and fire, according to said selected one of said first set of alternative options.

4,931,770

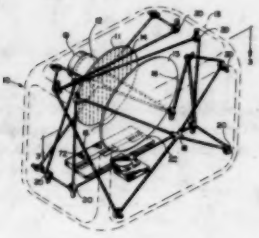
PROTECTION SYSTEM

Monte Abramson, Flushing, N.Y., assignor to Southern Integrity, Inc., Palm Beach, Fla.

Continuation-in-part of Ser. No. 104,806, Oct. 1, 1987, Pat. No. 4,814,749. This application Mar. 20, 1989, Ser. No. 325,659

Int. Cl.[5] G08B *13/00*

U.S. Cl. 340—541 18 Claims



1. In an audio and/or video system for transferring information stored on a disc, tape or film, the improvement comprising a cassette means for preventing the unauthorized or unintentional disclosure of said information on said disc, tape or film by intrusion into said cassette means, said cassette means being provided with access means for authorized retrieval of said information on said disc, tape or film, by an information processing device means for sensing unauthorized intrusion into said cassette means, an information destroying means, and means for moving said information destroying means into destructive contact with said disc, tape or film, when said means for sensing intrusion senses intrusion into said cassette means.

4,931,771

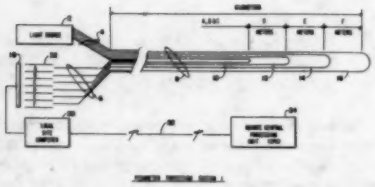
OPTICAL FIBER INTRUSION LOCATION SENSOR FOR PERIMETER PROTECTION OF PRECINCTS

Walter K. Kaha, Bethesda, Md., assignor to Anro Engineering, Inc., Lexington, Mass.

Filed Sep. 27, 1988, Ser. No. 249,823

Int. Cl.[5] G08B *13/18*

U.S. Cl. 340—556 13 Claims



1. A perimeter protection system for use in indicating the location of an intrusion into a protected area, said system comprising:

a light source for generating a light beam;

display means having a plurality of display areas;

a plurality of multimode gradient index optic fiber loops, each varying in length from each other by predetermined amounts and having every portion highly sensitive and substantially uniformly sensitive to an external disturbance applied at any point, said each having an input end coupled to said source of light for receiving said light beam, and said each loop having an output end coupled to said display means for projecting said light beam propagated along the length of said each of said plurality of optic fiber loops onto a different one of said plurality of display areas,

said plurality of multimode gradient index optic fiber loops forming a cable and having said input and said output ends at one end of said cable, said cable being positionable around a periphery of said protected area, said plurality of multimode gradient index optic fiber loops being positioned in said cable so that the distance along the cable of successive loops is equal to said predetermined amounts,

said each of said plurality of multimode gradient index optic fiber loops when in an undisturbed state conducting said light beam which projects a first type of pattern from said second end and when disturbed projects a dynamically varying beam which produces a transient characteristic second type of pattern from said second end;

said display means sensing said first type of pattern projecting onto each of said plurality of display areas, indications representing that there was no intrusion into said protected area, and sensing said second type of pattern projecting onto one or more of said plurality of display areas, indications representing the location of the intrusion.

4,931,772

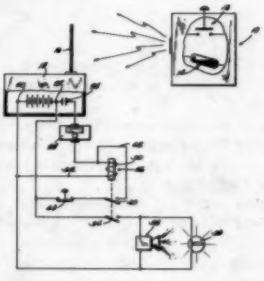
SAFETY MONITOR

Guy L. Bechtold, Lancaster, Pa., assignor to The Heil Company, Milwaukee, Wis.

Filed Nov. 14, 1985, Ser. No. 797,855

Int. Cl.[5] G08B *23/00*

U.S. Cl. 340—573 2 Claims



1. Apparatus for monitoring the condition of a worker, comprising,

radio frequency transmitter having a battery,

a position responsive switch adapted to be worn by a worker and responsive to a position indicative of the worker being disabled to cause said transmitter to transmit a signal,

a radio frequency receiver including a power supply, a relay,

an alarm switch and a holding switch operated by said relay,

a power switch operated by said received in response to said signal to connect said relay to said power supply to close said alarm switch and said holding switch,

alarm means operated when said alarm switch is closed, a holding circuit including said holding switch, said relay and said power supply,

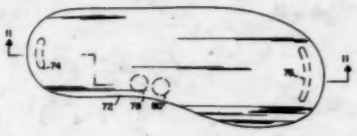
a termination switch operative to break said holding circuit, said relay including a coil which is connected to said power supply through said power switch and through both said holding switch and said termination switch.

4,931,773

SHOE FITTING SYSTEM

Henri E. Rosen, 229 Coolidge Ave., Watertown, Mass. 02172

Filed May 5, 1989, Ser. No. 348,261
Int. Cl.[5] G08B 21/00
U.S. Cl. 340—573 19 Claims



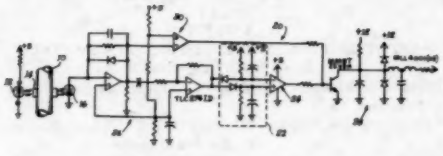
1. A shoe fitting system comprising a shoe having at least one translucent portion containing reference markings thereon to permit the viewing of the position of portions of a foot in said shoe in comparison to the reference markings thereon to determine the fit of the shoe relative to the foot therein.

4,931,774

LIQUID-VAPOR CHANGE OF PHASE DETECTOR

Wesley J. Bachman, Auburn, Ill., assignor to Dickey-John Corporation, Auburn, Ill.

Filed Aug. 17, 1988, Ser. No. 233,065
Int. Cl.[5] G08B 21/00
U.S. Cl. 340—603 6 Claims



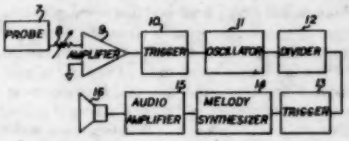
1. Apparatus for detecting a liquid-vapor change of phase in a fluid substance traveling through a conduit comprising: detector housing means providing a path of travel for said fluid and interposed in a portion of the fluid-carrying conduit in which said change of phase is to be detected; a source of radiation disposed for directing radiation into said path of travel; detector means for detecting radiation disposed generally at an opposite side of said path of travel from said source, such that radiation from said source will pass through the fluid in the path of travel prior to reaching said detector means; said detector means being responsive to radiation detected thereat for producing a corresponding electrical signal; and detector circuit means responsive to said electrical signal produced by said detector means or producing an output signal indicative of a liquid-vapor change of phase of the fluid in the conduit; wherein said detector circuit means comprises differential peak detector means coupled in circuit for receiving said electrical signal produced by said detector means and responsive thereto for providing as outputs two peak value signals corresponding to peak values of said electrical signal, difference amplifier means coupled to receive the outputs of said differential peak detector means and responsive thereto for producing an output signal which undergoes an abrupt change in level in response to the peak value signal reaching or exceeding a predetermined level and buffer amplifier means for receiving and buffering the output of said difference amplifier means.

4,931,775

PLANT WATERING NEED MONITOR

Jack W. Sheriff, 2167 Calle Guaymas, La Jolla, Calif. 92037

Continuation-in-part of Ser. No. 53,706, May 26, 1987. This application Jul. 21, 1988, Ser. No. 222,640
Int. Cl.[5] G08B 21/00
U.S. Cl. 340—604 14 Claims



1. An electrical device operating at low currents for signaling the watering needs of a plant by monitoring the moisture level of the soil around said plant comprising:

means for sensing said moisture level by generating an electrical signal generally proportional to said moisture level;

means for supporting said sensing means, shaped and dimensioned to be planted in said soil;

means for calibrating said device in accordance with the amount of water ordinarily needed by said plant;

a first semi-conductor switch having a drain terminal, a gate terminal and a source terminal, said drain terminal being connected to a voltage source through a load resistor, said gate terminal being connected to a signal reference ground, and said source terminal being connected to said electrical signal through a high value series resistor;

oscillating means for sending electrical pulses at a first frequency, said oscillating means being connected to said drain terminal and being triggered when the voltage differential between said signal and said voltage source causes a certain current flow across said first semi-conductor switch and said load resistor; and

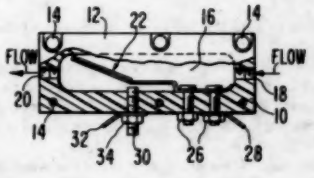
audio-means responsive to said oscillating means for generating an audio-signal.

4,931,776

FLUID FLOW SENSOR WITH FLEXIBLE VANE

Leo V. Klos, Newburyport, and Richard J. Hertel, Boxford, both of Mass., assignors to Varian Associates, Inc., Palo Alto, Calif.

Filed May 19, 1988, Ser. No. 195,988
Int. Cl.[5] G08B 21/00
U.S. Cl. 340—610 4 Claims



1. A fluid flow sensor comprising:

a body having an internal cavity and a first opening for conveying fluid into said cavity and a second opening for conveying fluid out of said cavity;

a thin flexible vane comprising a mounting portion, a contact portion including a first electrical contact means, and a distal portion, said mounting portion being fixedly mounted to said body, said contact portion being intermediate said mounting portion and said distal portion;

second electrical contact means inside said cavity;

first conduction means for conducting electricity between a point outside said body and said first electrical contact means; and

second conduction means for conducting electricity between a point outside said body and said second electrical contact means,

said distal portion of said vane being disposed at an angle relative to said contact portion so that fluid flowing through said cavity from said first opening to said second opening causes said vane to elastically bend so that said first electrical contact means contacts said second electrical contact means when the rate of flow of said fluid is above a first limit point and said first electrical contact means to not contact said second electrical contact means when the rate of flow of said fluid is below a preset threshold level which is less than said first limit point, said first electrical contact means remaining in contact with said second electrical contact means when said rate of flow decreases from above said first limit point until said rate reaches said preset threshold level.

4,931,777

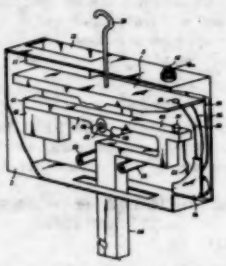
LOW LEVEL ALARM FOR DROP-FEED INJECTION LIQUID

Cheng-San Chiang, No. 32, Cheng-San Road, Tzu-Yang, Taiwan

Filed Nov. 16, 1988, Ser. No. 271,703

Int. Cl.[5] G08B 21/00; G01F 23/18

U.S. Cl. 340—613 **6 Claims**



1. A low level alarm for drop-feed injection liquid comprising:

a housing to hold the following mechanism of the device, including:

a chamber for holding a battery as a power source;

an electrical alarm means connected to said electrical source for giving an audible signal upon a low level condition;

trigger means for the alarm means to be actuated at low level of the liquid;

a switch means for deenergizing the alarm when the liquid has been replenished; and

a mechanical balance means comprised of a balance beam having two extended arms with one arm provided with suspender means to take a conventional drop-feed injection liquid bottle while the other arm includes a counter weight for balance; wherein the balance is an equilibrium state when the bottle is full of liquid and the consumption of the liquid causes a pivoting of said beam which ultimately triggers the alarm when the preset low level has been reached.

4,931,778

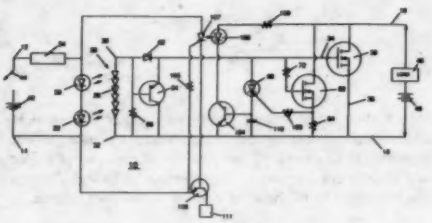
CIRCUITRY FOR INDICATING THE PRESENCE OF AN OVERLOAD OR SHORT CIRCUIT IN SOLID STATE RELAY CIRCUITS

Ciro Guajardo, Harbor City, Calif., assignor to Teledyne Industries, Inc., Los Angeles, Calif.

Filed Feb. 27, 1989, Ser. No. 316,189

Int. Cl.[5] H01H 71/04, 73/12

U.S. Cl. 340—664 **9 Claims**



1. In a solid state relay circuit using a power semiconductor as the output circuit switching device and having protection against current overload and short circuits, an indicator circuit for signaling that overload currents have occurred in the switching device comprising means for sensing that current overload protection has occurred, and switching means responsive to the sensing that current overload protection has occurred for operating a current overload indicator.

4,931,779

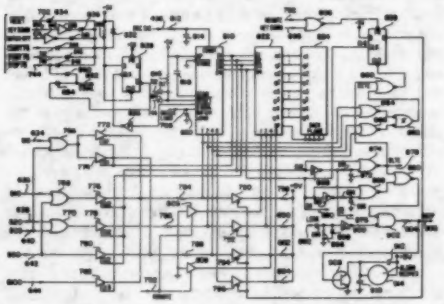
SIMPLIFIED AUDIBLE MISFEED ALARM FOR DOCUMENT COUNTER

Richard A. Melcher, Croydon, Pa., assignor to Brandt, Inc., Bensalem, Pa.

Division of Ser. No. 182,482, Apr. 15, 1988. This application Apr. 7, 1989, Ser. No. 334,476

Int. Cl.[5] G08B 21/00

U.S. Cl. 340—674 **5 Claims**



1. Apparatus including in combination means for advancing sheets along a path, a counter having an internal oscillator for producing a binary coded output in response to count signals applied to said counter, means responsive to the movement of sheets along said path for applying count signals to said counter an audible alarm, and means responsive to the misfeed of a sheet along said path for coupling said oscillator to said alarm.

4,931,780

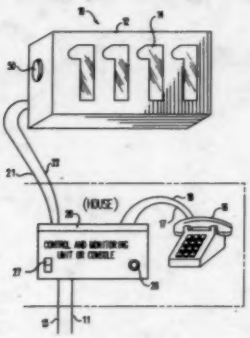
ILLUMINATED ADDRESS IDENTIFIER AND ALARM DEVICE

David G. LaMont; Madeline A. LaMont, and Richard T. Donnell, all of 11049 W. Crimson La., Phoenix, Ariz. 85039

Filed May 23, 1989, Ser. No. 355,426

Int. Cl.[5] G08B 3/00

U.S. Cl. 340—691 1 Claim



1. An illuminated address identifier and alarm device, comprising:

control means operatively connected to a telephone within a dwelling for detecting a dialled 911 signal;

a remote alarm unit having a housing mounted exteriorly of a dwelling;

indicia representing a street address of said dwelling on said housing;

a first light source in said housing for illuminating said indicia to aid in locating said address at night in a non-emergency mode;

a strobe light in said housing to identify said address vicinity from a distance to aid rescue personnel with a clear identification of the general location of said address and ultimately pinpointing the exact location of the emergency 911 caller;

an audible alarm in said housing;

a transformer in said dwelling having a primary stage connected to a source of AC power;

a rectifier connected to a secondary stage of said transformer for providing a DC power supply;

a battery in said housing;

a recharging unit in said housing connected to said battery and said rectifier;

a first double-throw relay having a coil connected to said AC power source;

a first input contact of said first relay connected to said rectifier;

a second input contact of said first relay connected to said battery;

an output contact of said first relay connected to a DC input of said control means;

said control means including switching means for connecting said DC input to said control output in response to detection of said 911 signal;

a second single throw relay having a coil connected for energization by said control output;

a first input contact of said second relay connected to said output contact of said first relay;

a second output contact of said second relay connected with said first input contact of said second relay upon energization of said second relay coil;

said first light independently controlled by a photocell to aid in location of said address at night in a non-emergency mode; and

said first light, said strobe light and said audible alarm means connected in parallel for activation by said output contact of said second relay.

4,931,781

CURSOR MOVEMENT CONTROL KEY SWITCH

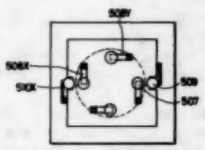
Akira Miyakawa, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 462,077, Jan. 28, 1983, abandoned. This application Feb. 17, 1987, Ser. No. 16,480

Claims priority, application Japan, Feb. 3, 1982, 57-16770; Apr. 28, 1982, 57-70205; Jun. 30, 1982, 57-111470; Jul. 28, 1982, 57-130418; Jul. 28, 1982, 57-130419; Jul. 28, 1982, 57-130420; Jul. 28, 1982, 57-130421; Jul. 29, 1982, 57-131188; Jul. 29, 1982, 57-131189

Int. Cl.[5] G09G 3/02

U.S. Cl. 340—706 4 Claims



1. A cursor movement control key comprising:

a key top mounted for displacement in a plane and for depression movement in a direction perpendicular to the plane;

a plurality of first balls mounted to be moved by the movement of said key top in said plane;

a plurality of second balls mounted to be moved by depression movement of said key top in the direction perpendicular to said plane;

a plurality of first detection means for detecting the displacement of said plurality of first balls; and

a plurality of second detection means for detecting the displacement of said plurality of second balls.

4,931,782

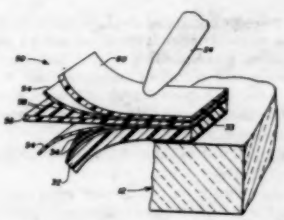
TOUCH SCREEN OVERLAY WITH IMPROVED CONDUCTOR DURABILITY

Scott C. Jackson, Kennett Square, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jun. 24, 1988, Ser. No. 210,961

Int. Cl.[5] G08C 21/00; G09G 3/02

U.S. Cl. 340—706 14 Claims



1. A touch screen overlay for detection of both finger touch and stylus on the viewing surface of a visual display device comprising:

a first flexible substrate of transparent insulative material one surface adapted for attachment to the viewing surface of said visual display device;

a first set of transparent conductors formed in a parallel

array on a second surface of said first flexible substrate, said second surface and the conductors thereon facing away from the viewing surface of said visual display device;

a second flexible substrate of transparent insulative material disposed at one surface thereof adjacent to the second surface of said first flexible substrate;

a second set of transparent conductors formed in a parallel array on a second surface of said second flexible substrate, said second set of transparent conductors also facing away from the viewing surface of said visual display device and having an orientation perpendicular to the first set of transparent conductors so that both sets form a grid-like pattern when superimposed, separated by at least the thickness of said second flexible substrate which is both thin enough to assure that signal strength of the transparent conductors is sufficient for detection of finger touch and yet thick enough to withstand the forces exerted by the stylus; and

coating means disposed adjacent to the second surface of said second flexible substrate, said coating means also facing a user and serving as the overlay surface for interactive input by both finger touch and stylus detection means;

whereby when said coating means is contacted by either finger touch or a stylus detection means, the transparent conductors of both said first and second sets located below the area of contact will be subjected to substantially only compression forces due to any downward deflection on the overlay caused by said contact.

4,931,783

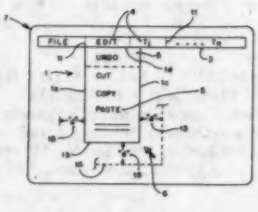
METHOD AND APPARATUS FOR REMOVABLE MENU WINDOW

William D. Atkinson, Los Gatos, Calif., assignor to Apple Computer, Inc., Cupertino, Calif.

Filed Jul. 26, 1988, Ser. No. 224,304

Int. Cl.[5] G09G *5/14*

U.S. Cl. 340—710 **12 Claims**



1. In a computer controlled display system having a display wherein a command option is displayed along a menu bar and command items corresponding to said command option are displayed once said command option has been selected, said command items being displayed within a menu window having a border, a method for removing said menu window from said menu bar comprising the steps of:

generating and displaying said menu bar having said command option;

positioning a cursor on said display using a cursor control means, the manipulation of said cursor control means by a user resulting in a corresponding movement of said cursor on said display;

displaying said menu window by selecting said command option, said command option being selected by said user's control of a signal generation means being coupled to said computer controlled display system;

removing said menu window from said menu bar while displaying said menu window by manipulating said cursor control means so as to move said cursor across said border, whereby said menu window may be removed from said menu bar.

4,931,784

COMPUTER GRAPHICS

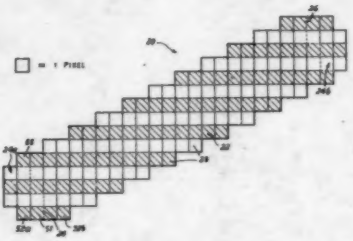
James E. Easterbrook, Sutton, England, assignor to Rank Cintel Limited, United Kingdom

Filed Jun. 19, 1987, Ser. No. 64,198

Claims priority, application United Kingdom, Jun. 19, 1986, 8614915

Int. Cl.[5] G09G *1/06*

U.S. Cl. 340—728 **22 Claims**



1. A method of generating a line segment display comprising multiple-pixel lines and drawn according to a predetermined brush shape on a video screen, comprising the steps of:

defining in said line segment, during generation, a middle section and two peripheral sections contiguous with said middle section;

generating said middle section as a series of parallel bars of pixels which extend in a predetermined direction on said video screen, said parallel bars being staggered in said predetermined direction with respect to each other according to the slope of said line segment; and

determining outlines of said peripheral sections according to said predetermined brush shape used to draw said line segment.

4,931,785

DISPLAY APPARATUS

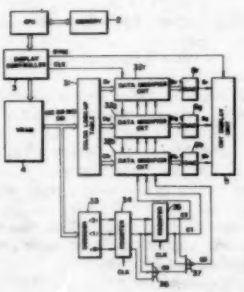
Takatoshi Ishii, Tokyo, Japan, assignor to Ascii Corporation, Tokyo, Japan

Filed Jun. 12, 1987, Ser. No. 62,151

Claims priority, application Japan, Jun. 17, 1986, 61-140877; Jan. 6, 1987, 62-693

Int. Cl.[5] G00F *9/30*

U.S. Cl. 340—703 **7 Claims**



1. A color image display apparatus for use with a color

display means responsive to a plurality of color signals, and for displaying a color graphic image having at leaft one region composed of a plurality of display dots and defined by boundaries, said plurality of display dots having colors determined respectively by color display data which are converted into said color signals, said color image display apparatus comprising:

(a) display memory means for storing a plurality of color display codes and modifier codes therein, said color display codes and said modifier codes corresponding to display dots of said color graphic image which coincide with said boundaries;

(b) data judgment means for judging whether or not said modifier codes are inputted therein, said data judgment means outputting control signals corresponding to the value of said modifier codes when said modifier codes are inputted into said data judgment means;

(c) data conversion means for converting said color display codes into color display data;

(d) data modifier means for modifying said color display data based on said control signals, so as to produce color display data of said color graphic image, said data modifier means comprising

(1) data register means for successively inputting said color display data therein, and

(2) modifier means for modifying said color display data stored in said data register means, said modification of said color display data being based on said control signals, said data register means outputting modified color display data; and

(e) a color display means for displaying a color graphic image corresponding to said modified color display data from said data register means.

4,931,786

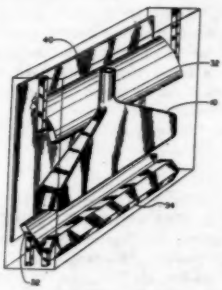
ELECTRONIC IMAGE DISPLAY SYSTEMS WITH IMPROVED CATHODE-RAY TUBE CONSTRUCTION

Howard W. Selby, III, Boulder, Colo., assignor to Selsys Corporation, Boulder, Colo.

Filed Feb. 16, 1988, Ser. No. 156,287

Int. Cl.[5] G09G *3/20*

U.S. Cl. 340—755 **14 Claims**



1. An electronic image display system for receiving a image signal from a incoming image signal source, said signal corresponding to a raster san of an image to be produced and including sequential line portions, each line portion containing color information for each of a plurality of different colors, said system comprising:

a. line-developing means for receiving color information derived from color information of each line portion of an input image signal and for establishing in a line-developing region a plurality of spaced parallel horizontal lines of light of different colors;

b. a screen for display of an image which corresponds to said image signal;

c. means including vertical raster scanner means and associated optical means for projecting light of said horizontal lines of said line-developing region to said screen and to develop horizontal lines in a corresponding image region at said screen and for operating at vertical repetition rate to perform repetitive scans of said screen, said image region in each scan being moved in one direction at a certain vertical velocity relative to said screen to produce at said screen a raster scanned image from the said horizontal lines; and

d. convergence means for timing application of color information of sequential line portions of an input image signal to said line-developing means in accordance with the order of development of said lines of different colors, the vertical spacing of said horizontal lines in said image region and said vertical velocity of movement across said screen to effect a convergence of the images produced at said screen from said horizontal lines of said line-developing means.

4,931,787

ACTIVE MATRIX ADDRESSED DISPLAY SYSTEM

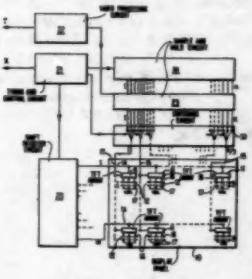
John M. Shannon, Whyteleafe, England, assignor to U.S. Philips Corporation, New York, N.Y.

Filed May 23, 1988, Ser. No. 197,553

Claims priority, application United Kingdom, May 29, 1987, 8712648

Int. Cl.[5] G09G *3/36*

U.S. Cl. 340—784 **25 Claims**



1. A matrix display system comprising an active matrix display device having an array of picture elements arranged in rows and columns and defined by opposing electrodes with an electro-optical display medium disposed therebetween, switching elements associated with the picture elements and selectively operable by switching signals to apply data signals to the picture element electrodes, and switching signal and data signal conductors for supplying switching signals and data signals respectively to each switching element, characterised in that the picture elements are arranged in groups of at least two picture elements with the picture elements of each group being addressed via the same switching signal and data signal conductors, the switching elements associated with the picture elements of each group being operable at respective different voltage levels of the switching signal.

4,931,788

TRANSPONDER AND INTERROGATOR

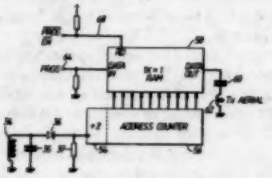
M. Martin Creswick, Blackwell Heath, England, assignor to Meridian Micro-Systems Ltd., London, England

Filed Dec. 2, 1987, Ser. No. 127,939

Claims priority, application United Kingdom, Dec. 5, 1986, 8629170; Dec. 9, 1986, 8629383; Dec. 9, 1986, 8629384

Int. Cl.[5] H04Q *1/00*

U.S. Cl. 340—825.54 **23 Claims**



1. A transponder, comprising:

means for receiving an interrogating signal having a periodic envelope sent from an interrogating means, including a transmitter and a receiver;

means for demodulating the received signal to produce a periodic baseband signal; and

means for transmitting data serially and direct, without modulating a carrier from said transponder to said interrogating means at a rate determined by the periodicity of the baseband signal and means for reading out of memory a representation of a carrier modulated by said data, the carrier having a frequency also determined by the periodicity of the baseband signal.

4,931,789

APPARATUS AND METHOD FOR A UNIVERSAL ELECTRONIC LOCKING SYSTEM

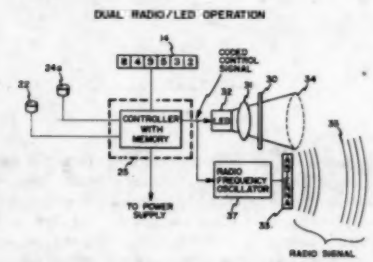
Douglas A. Pinnow, Laguna Hills, Calif., assignor to Universal Photonix, Inc., Laguna Hills, Calif.

Continuation of Ser. No. 40,538, Apr. 17, 1987, abandoned, which is a continuation-in-part of Ser. No. 628,517, Jul. 6, 1984, Pat. No. 4,665,397, which is a continuation-in-part of Ser. No. 547,713, Nov. 1, 1983, Pat. No. 4,573,046. This application May 12, 1988, Ser. No. 193,083

The portion of the term of this patent subsequent to May 12, 2004, has been disclaimed.

Int. Cl.[5] G06F *15/20*

U.S. Cl. 340—825.56 **20 Claims**



1. An electronically actuated locking system comprising a signal transmitting unit energized by a self-contained power source; said signal transmitting unit comprising first electromagnetic radiation emitting means, other than light emitting means, a first controller which activates said electromagnetic radiation emitting means so as to transmit an encoded electromagnetic signal, other than an optical signal, to a signal receiving unit, said first controller including a first programmable memory unit for storing data corresponding to a plurality of different encoded signals and means for entering said data into said first memory unit, said signal receiving unit comprising first means for receiving said encoded electromagnetic signal, means for comparing a received encoded signal to one or more codes contained in a second programmable memory unit capable of storing data corresponding to a plurality of different encoded signals, means for entering said data into said second memory unit and means for deactivating a lock mechanism when said encoded signal matches one of said one or more codes contained in said second memory unit.

4,931,790

DIGITAL REMOTE CONTROL METHOD

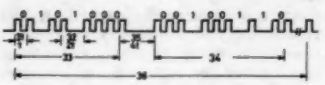
Hiroshi Kobayashi, and Shinji Suda, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 727,153, Apr. 25, 1985, abandoned. This application Feb. 8, 1988, Ser. No. 154,451

Claims priority, application Japan, Apr. 25, 1984, 59-85332

Int. Cl.[5] H04Q *9/00*

U.S. Cl. 340—825.64 **3 Claims**



1. A remote control method comprising the steps of:

providing a custom code, said custom code comprising a plurality of a first number of bits indicative of a particular receiving unit, "0" and "1" bits of said custom code being distinguished by respective different time intervals between adjacent pulses;

providing an instruction code, said instruction code comprising a plurality of a second number of bits different from said first number and indicative of a predetermined operation to be carried out by said receiving unit, "0" and "1" bits of said instruction code being distinguished by the same intervals between adjacent pulses as said custom code;

providing a transmission code comprising said custom code followed by said instruction code, said custom code and said instruction code being separated from one another by a predetermined fixed time interval greater than said time intervals between adjacent pulses distinguishing said "0" and "1" bits, said predetermined fixed and time interval being a period during which a signal level remains substantially constant; and

optically transmitting said transmission code.

4,931,791

SHORTED-COAXIAL-CABLE DETECTOR FOR LOCAL-AREA NETWORKS

William C. Mallard, Jr., Nashua, N.H., assignor to Digital Equipment Corporation, Maynard, Mass.

Filed Jun. 25, 1987, Ser. No. 67,104

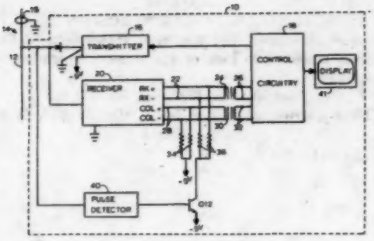
Int. Cl.[5] H04Q *1/00*

U.S. Cl. 340—825.500 **4 Claims**

1. For use in a local-area-network device adapted for connection to a local-area-network cable, the combination comprising:

(A) a transmitter selectively operable to assume an inactive state, in which it drives no substantial current through the cable, and an active state, in which it transmits binary signals by selectively driving current through the cable at one of two predetermined magnitudes in the same direction so as to cause voltages within predetermined voltage ranges of a given polarity on the cable when the cable is not shorted; and

(B) short-detection means for monitoring the local-area-network cable to detect a reversal of the voltage on the cable



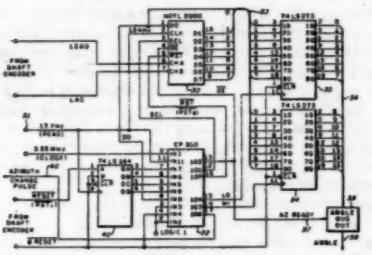
while the transmitter is in its active state and for generating a short-indicating signal in response to such a reversal.

4,931,792

SHAFT ANGLE ENCODER INTERFACE

Mark J. Baginski, Boyd Tavern, Va., assignor to Sperry Marine Inc., Charlottesville, Va.

Filed May 9, 1988, Ser. No. 191,922
Int. Cl.[5] H03M *1/30*
U.S. Cl. 340—870.19 **11 Claims**



1. Interface apparatus for an incremental shaft angle encoder for measuring the angular position of a shaft, said encoder providing two alternating signals, phase displaced with respect to each other, said interface apparatus providing a digital signal in accordance with the two alternating signals which is representative of the angular position, the apparatus comprising:

a low frequency clock for providing a low frequency clock signal,

a high frequency clock for providing a high frequency clock signal,

an integrated circuit responsive to said two alternating signals and to said low frequency clock signal for providing said digital signal in accordance with said two alternating signals, said integrated circuit further responsive to control signals, including an output enable signal, for controlling outputting said digital signal, said low frequency clock signal utilized to sample said two alternating signals and to time said integrated circuit, and

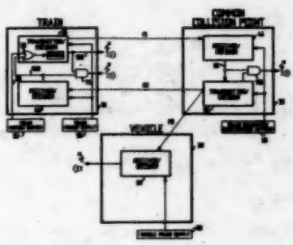
a state machine responsive to said low and high frequency clock signals for outputting a sequential plurality of states providing said control signals to said integrated circuit in response to said low frequency clock signal and sequencing said states in response to said high frequency clock signal.

4,931,793

SYSTEM FOR PROVIDING A WARNING WHEN VEHICLES APPROACH A COMMON COLLISION POINT

Norbert Fuhrmann, Palm Beach Gardens, and Nick Friedman, West Palm Beach, both of Fla., assignors to Solitron Devices, Inc., Riviera Beach, Fla.

Filed Jul. 1, 1988, Ser. No. 214,444
Int. Cl.[5] G08G *1/16*
U.S. Cl. 340—903 **12 Claims**



1. A system for providing a warning when a first vehicle and a second vehicle are near a common collision point, the first vehicle having an active state, said system comprising:

first transmitter means for transmitting a first radio frequency signal from the first vehicle in response to either the first vehicle being in the active state or a first control signal;

warning means for receiving said first radio frequency signal at the common collision point and for transmitting a second radio frequency signal from the common collision point in response to receiving said first radio frequency signal;

first receiving means for receiving said second radio frequency signal at the first vehicle and for providing said first control signal in response to receiving said second radio frequency signal; and

second receiving means for receiving said second radio frequency signal at the second vehicle and for providing an indication of receiving said second radio frequency signal so as to provide a warning that the first vehicle and the second vehicle are near the common collision point.

4,931,794

OPTOELECTRONIC KEYBOARD

Ernst Haag, Heilbronn; Günter Haag, Stuttgart; Georg Leitner, Nürnberg, and Konrad Farnbauer-Schmidt, Lauf, all of Fed. Rep. of Germany, assignors to Telefunken Electronic GmbH, Heilbronn, Fed. Rep. of Germany

Filed Dec. 29, 1987, Ser. No. 139,209
Claims priority, application Fed. Rep. of Germany, Jan. 14, 1987, 3700856
Int. Cl.[5] H03K *17/969*
U.S. Cl. 341—31 **14 Claims**

1. An optoelectronic keyboard, comprising:

a plurality of transmitting elements for transmitting a luminous flux,

a plurality of receiving elements for receiving said flux

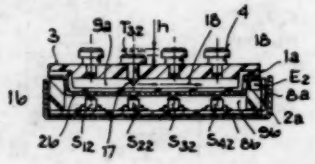
an activation circuit for activation of the individual transmitting elements in one of time or frequency multiplex operation or a special merged operation,

an evaluation circuit for processing the signal path of different multiplex cycles received by said receiving elements, said evaluation circuit including predetermined threshold values and means for adding consecutive multiplex cycles to determine signal changes,

a main body in which said transmitting and receiving elements are arranged, said main body including a cover and

having a first space for flux flow between said elements and a second space for housing said evaluation circuit and said activation circuit, said first space for flux flow in the main body being separated and shielded from the second space containing the activation and evaluation circuits,

a plurality of mechanical keys guidably arranged in said cover and having key stems shaped for altering flux flow between said transmitting and receiving elements and for converting diverging bundles of rays from said transmitting elements into essentially parallel bundles of rays



which extend essentially parallel to said cover, with the changes in the luminous flux caused by actuation of one of said keys resulting in a signal which defines the actuated key, and

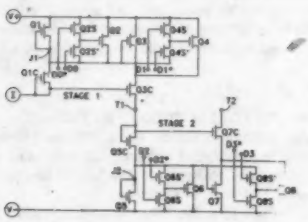
shielding for said main body that has the effect of an optical and electromagnetic shield and including shielding means comprising one of a metal coating and a metal plate which encloses the entire space containing the evaluation circuit and which is provided with openings for entering and exiting light.

4,931,795

DIGITAL TO ANALOG SIGNAL CONVERTER

John C. Gord, Los Angeles, Calif., assignor to Alfred E. Mann Foundation, Sylmar, Calif.

Filed Aug. 9, 1989, Ser. No. 391,437
Int. Cl.[5] H03M 1/66
U.S. Cl. 341—135 **11 Claims**



1. A D to A converter stage comprising:

a current mirror including an input transistor and an output transistor connected to a supply voltage, the input transistor also being connected to a reference current source and the output transistor being connected to an output for the current mirror;

a current adjusting transistor in parallel with each of the input and output transistors for adjusting the output current of the current mirror as a function of the operating states of the current adjusting transistors;

digital signal activated switch means for selectively controlling operation of each current adjusting transistor; and

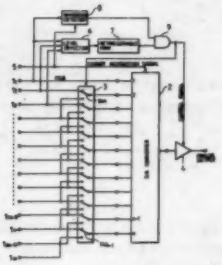
circuit means for regulating drain voltages on the input and output transistors whereby the values of currents flowing in the input and output transistors and hence the value of the output current is a direct function of the relative geometric sizes of the input, output and current adjusting transistors.

4,931,796

DIGITAL-TO-ANALOG CONVERSION CIRCUIT

Yoshinori Hasegawa, and Kiyofumi Hirai, both of Saitama, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Filed Nov. 16, 1988, Ser. No. 271,963
Claims priority, application Japan, Mar. 3, 1988, 63-50420
Int. Cl.[5] H03M 1/78
U.S. Cl. 341—154 **6 Claims**



1. A digital-to-analog conversion circuit comprising level detection means for detecting when a signal level of an input digital signal of m bits is lower than a predetermined set value, digital-to-analog (D/A) conversion means of n bits (n being smaller than m), means responsive to a predetermined control signal for shifting said input digital signal in the direction of the most significant bit (MSB) by a predetermined number of bits and to supply the shifted digital signal to said digital-to-analog conversion means, and means responsive to said predetermined control signal for attenuating the signal level of an output analog signal of said digital-to-analog conversion means by a value corresponding to said predetermined number of bits, the improvement comprising:

inversion detection means for detecting an inversion in polarity of said input digital signal; and

means for producing said predetermined control signal at a first polarity inversion detected by said inversion detection means after the lapse of a predetermined time from a point in time of a detection by said level detection means.

4,931,797

FOLDING CIRCUIT AND SERIAL-TYPE A/D CONVERTER

Minoru Kagawa, Osaka, and Akira Matsuzawa, Neyagawa, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Nov. 14, 1988, Ser. No. 272,056
Claims priority, application Japan, Nov. 11, 1987, 62-284505; Jun. 7, 1988, 63-139984
Int. Cl.[5] H03M 1/44
U.S. Cl. 341—162 **4 Claims**

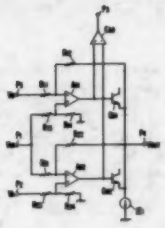
2. A serial analog-to-digital converting circuit comprising a plurality of cascade connected folding circuit cells, each of said plurality of cascade connected folding circuit cells including an input terminal and an output terminal, wherein the output terminal of a cascade connected folding circuit cell of a preceding stage is coupled to the input terminal of a cascade connected folding circuit cell of a succeeding stage, each of said cascade connected folding circuit cells further including:

a first operational amplifier having an inverting input, a noninverting input, and an output, said inverting input of said first operational amplifier coupled to said input terminal;

a first transistor having a base coupled to said output of said first operational amplifier, and having an emitter coupled to said output terminal;

a first feedback means for coupling said output terminal to said inverting input of said first operational amplifier;

a second operational amplifier having an inverting input, a noninverting input, and an output, said noninverting input



of said second operational amplifier coupled to said input terminal;

a second transistor having a base coupled to said output of said second operational amplifier, and having an emitter coupled to said output terminal; and,

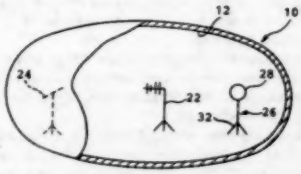
a second feedback means for coupling said output terminal to said inverting input of said second operational amplifier.

4,931,798

ELECTROMAGNETIC ANECHOIC CHAMBER WITH AN INNER ELECTROMAGNETIC WAVE REFLECTION SURFACE AND AN ELECTROMAGNETIC WAVE ABSORPTION SMALL BALL DISPOSED IN THE CHAMBER

Masanori Kogo, Miyagi, Japan, assignor to Tokin Corporation, Sendai, Japan

Filed Jun. 2, 1988, Ser. No. 201,555
Claims priority, application Japan, Jun. 3, 1987, 62-85710[U]
Int. Cl.[5] H01Q *17/00*
U.S. Cl. 342—4 **7 Claims**



1. An electromagnetic anechoic chamber for providing a closed space for containing an electromagnetic device emitting an electromagnetic wave therein, an echo of the electromagnetic device being suppressed within said closed space, said electromagnetic anechoic chamber comprising:

an electromagnetically shielding wall having an inner surface of a substantially ellipsoidal shape with a first and a second focus point, said inner surface defining said closed space and reflecting said electromagnetic wave into said closed space as a reflected wave;

electromagnetic absorption means located at said first focus point for absorbing said reflected wave to thereby remove the reflected wave from said closed space; and

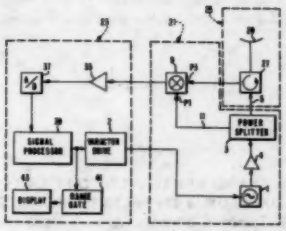
receiving means located between said first and said second focus points for receiving said electromagnetic wave, said second focus point being determined as a specific point at which said electromagnetic device is located.

4,931,799

SHORT-RANGE RADAR TRANSCEIVER EMPLOYING A FET OSCILLATOR

Cheng P. Wen, Mission Viego, and Richard T. Hennegan, Torrance, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Apr. 24, 1989, Ser. No. 342,850
Int. Cl.[5] G01S *13/34*; H04B *1/28*
U.S. Cl. 342—110 **14 Claims**



1. A short-range radar transceiver operable over a range in which the sideband noise doe snot obscure the intermediate frequency signal, comprising:

field effect transistor oscillator means for generating at time varying signal;

antenna means for transmitting signals to a target and for receiving signals reflected from a target;

means for coupling said time varying signal to said antenna means to be transmitted therefrom;

a balanced mixer having a first port for receiving said time varying signal and a second port for receiving signals from said antenna means and functioning as an AM noise suppressor, for producing an intermediate frequency signal; and

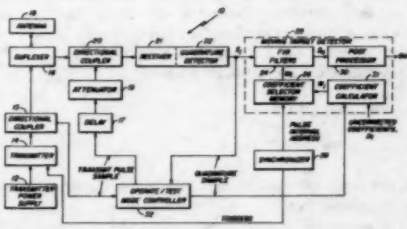
signal processing means responsive to said intermediate frequency signal for producing indications of the range and/or the rate of change of said range of said target.

4,931,800

STAGGER COMPENSATED MOVING TARGET DETECTOR

Harold R. Ward, Bedford, Mass., assignor to Raytheon Company, Lexington, Mass.

Filed May 12, 1989, Ser. No. 351,004
Int. Cl.[5] G01S *13/526*
U.S. Cl. 342—162 **16 Claims**



1. A radar system having stagger compensation in a moving target detector comprising:

means for transmitting pulses with staggered pulse repetition frequency (PRF);

means for receiving return signals from said transmitted pulses;

means for storing in said moving target detector predetermined weighting coefficients corrected for pulse stagger amplitude and phase errors on said transmitted pulses, said predetermined corrected weighting coefficients being determined during a test mode of said radar system;

means coupled to said receiving means and said storing means for filtering quadrature samples of said received return signals of sequences of said transmitted pulses in accordance with said corrected weighting coefficients received from said storing means; and

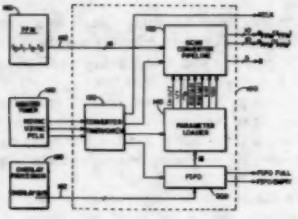
means coupled to said storing means and said transmitting means for synchronizing said corrected weighting coefficients for said filter means with said transmitted pulses.

4,931,801

METHOD AND APPARATUS TO SCAN CONVERT RADAR VIDEO TO TELEVISION OUTPUTS

William R. Hancock, Phoenix, Ariz., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Apr. 24, 1989, Ser. No. 342,352
Int. Cl.[5] G01S 7/298
U.S. Cl. 342—185 **9 Claims**



9. A method for converting polar format video data comprising video pixels each having an associated intensity value in a polar raster display into a horizontal raster format output to a TV monitor, wherein the TV monitor includes a display screen including a plurality of pixels and wherein each pixel has a corresponding X,Y address, wherein the method comprises the steps of:

(a) storing the video pixels indexed by radial and angular coordinates;

(b) translating a display X,Y address into corresponding angular and radial coordinates, and wherein the translating step further comprises the steps of:

(i) initializing the X,Y coordinates on a line basis;

(ii) adding delta x and delta y where

$$\text{delta } x = SF_B * COS(\Theta),$$

$$\text{delta } y = SF_B * SIN(\Theta),$$

Θ is the angle of rotation, and SF_B is the display-to-radar coordinate scale factor;

(c) scanning the storage means using the translated X,Y address to access at least four video pixels surrounding the translated X,Y address; and

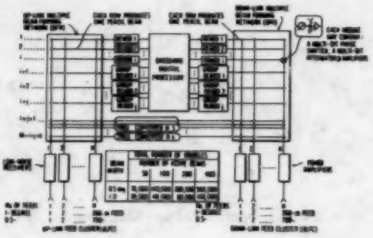
(d) interpolating an intensity value for the translated X,Y address as a function of the intensity values associated with the surrounding pixels.

4,931,802

MULTIPLE SPOT-BEAM SYSTEMS FOR SATELLITE COMMUNICATIONS

Francois T. Assal, Bethesda; John V. Evans, Gaithersburg, both of Md.; Christoph E. Mahle, Washington, D.C.; Amir I. Zaghloul, Bethesda, and Ramesh K. Gupta, Rockville, both of Md., assignors to Communications Satellite Corporation

Filed Mar. 11, 1988, Ser. No. 167,287
Int. Cl.[3] H04B 7/19
U.S. Cl. 342—356 **40 Claims**



1. A communications relay apparatus of the type including receive means for receiving communications over a plurality of receiving channels transmit means for transmitting communications over a plurality of transmit channels, and means for routing communications received over any of said receiving channels to any of said transmit channels, said relay apparatus comprising:

first receive outer switching means having inputs connected to a first plurality of said receive channels and selectively directing its inputs to any one of at least first and second outputs;

at least a first demodulator connected to said first output of said first receive outer switching means for providing demodulated data from at least one of said first and second receive channels;

at least a first input means connected to said second output of said first receive outer switching means and for providing modulated data from at least one of said first and second channels;

second receive outer switching means having inputs connected to at least third and fourth receive channels and selectively directing its inputs to any one of at least first and second outputs;

at least a second demodulator connected to said first output of said second receive outer switching means for providing demodulated data from at least one of said third and fourth receive channels;

at least a second input means connected to said second output of said second receive outer switching means and for providing modulated data from at least one of said third and fourth channels;

first inner switching means having at least first and second inputs connected to outputs of said first and second demodulators, respectively, said first inner switching means selectively directing demodulated data from its first and second inputs to either of at least first and second outputs of said first inner switching means;

second inner switching means having at least first and second inputs connected to outputs of said first and second input means, respectively said second inner switching means selectively directing modulated data from its first and second inputs to either of at least first and second outputs of said second inner switching means;

a first remodulation means having an input connected to said first output of said first inner switching means;

a first output means connected to said first output of said second inner switching means; and

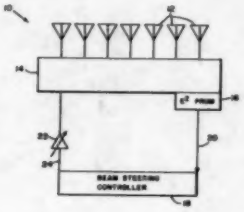
first transmit outer switching means having at least a first input connected to an output of said first remodulation means and a second input connected to said first output means, said first outer transmit switching means selectively directing modulated data from its first and second inputs to either of at least first and second outputs of said first outer transmit switching means.

4,931,803

ELECTRONICALLY STEERED PHASED ARRAY RADAR ANTENNA

Steve R. Shimko, Ellicott City, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 31, 1988, Ser. No. 176,123
Int. Cl.[5] H01Q 3/22
U.S. Cl. 342—371 **3 Claims**



1. An electronically steered phased array antenna system for radar systems, which is calibrated and tuned to compensate for manufacturing variations such as the phase control module insertion difference, phase shift variation due to temperature fluctuations, and antenna mounting misalignment, comprising:

(a) a phased array radar antenna having a microwave phase shifter for inserting a predetermined amount of path deplay into each radiating element of said antenna, the amount of which is a function of the beam pointing angle and the beam shape;

(b) a beam steering controller connected to said microwave phase shifter, and comprising means to control said phase shifter to calibrate and tune said antenna to compensate for manufacturing variations such as the phase control module insertion difference, phase shift variations due to temperature fluctuations, and antenna mounting misalignment specifically relating to said antenna;

(c) an electronically erasable programmable read only memory device disposed on said antenna for storing predetermined data parameters relating to said manufacturing variations; and

(d) a serial data link between said electronically erasable programmable read only memory device and said controller for adjusting said microwave phase shifter in accordance with said calibration said tuning data.

4,931,804

AUTOMATIC TICKET DISPENSER

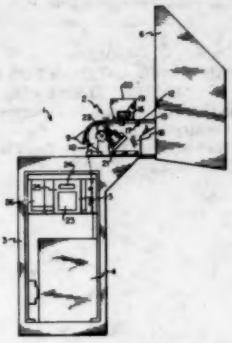
John R. Maud, and Allan S. Cooper, both of Pietermaritzburg, South Africa, assignors to Latilla Holdings (Guernsey) Limited, Guernsey, Channel Islands

Filed Aug. 25, 1988, Ser. No. 236,644
Claims priority, application South Africa, Aug. 27, 1987, 87/6389
Int. Cl.[5] G01D 15/20; G06K 15/00
U.S. Cl. 346—93 **9 Claims**

1. An automatic ticket dispenser comprising:

ticket feed means for dispensing tickets in a path, an electronic time clock for clocking time, an electronic print head assembly in the path for printing required information concerning time as reflected by the time clock onto the tickets as the tickets are dispensed in a substantially continuous manner through the feed means; and

a lower support plate and an upper guide plate between



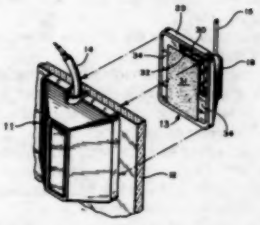
which passes the path, said plates having apertures therethrough for the print head to access the tickets to be printed one at a time and having apertures therethrough for optical sensors to access a ticket's surface.

4,931,805

ADHESIVE SYSTEM AND METHOD FOR MOUNTING A CELLULAR TELEPHONE ANTENNA

Roger K. Fisher, Mundelein, Ill., assignor to The Antenna Company, Countryside, Ill.

Filed May 16, 1988, Ser. No. 194,469
Int. Cl.[5] H01Q 1/32
U.S. Cl. 343—715 **18 Claims**



8. An antenna for mounting on the window of a vehicle, comprising:

an inside coupling unit having a flat window engaging surface for engaging the inside surface of the window;

an outside coupling unit comprising a base member having a flat window engaging surface adapted to engage said window in general registration with said window engaging surface of said inside coupling unit, and a radiating element mounting portion;

a radiating element attached to said radiating element mounting portion;

said base member including a channel integrally formed on said window engaging surface and extending around at least a substantial portion of the periphery of said window engaging surface to at least partially encircle a central adhesion portion thereof;

an adhesive layer overlying at least a substantial portion of said central adhesion portion for adhesively securing said adhesion portion to the outside surface of the window; and

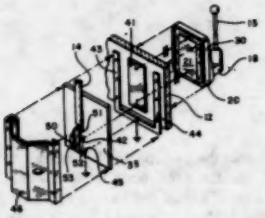
a bead of silicone material deposited in said channel for forming when brought into contact with said outside surface a seal between said base member and said outside surface to protect said adhesive layer from the environment of the outside coupling unit.

4,931,806

WINDOW MOUNTED ANTENNA FOR A CELLULAR MOBILE TELEPHONE

Blake A. Wunderlich, LaGrange, Ill., assignor to The Antenna Company, Countryside, Ill.

Filed May 16, 1988, Ser. No. 194,466
Int. Cl.[5] H01Q 1/32
U.S. Cl. 343—715 6 Claims



1. An antenna for mounting on the window of a vehicle and adapted for operation at a predetermined operating frequency in conjunction with a utilization device within the vehicle, comprising:

an elongated radiating element having an electrical length of at least ¼ wavelength and a predetermined capacitive base reactance at the operating frequency;

a first coupling member electrically connected to said radiating element and having a generally planar surface for engaging the outer surface of the window;

a housing;

a circuit board having a flat window engaging surface disposed within said housing;

a second coupling member comprising a metallic foil on said window engaging surface of said circuit board, said foil having dimensions generally corresponding to the dimensions of said first coupling member;

means for mounting said first coupling member on the outside surface of said window and said circuit board on the inside surface of said window with substantial portions of said coupling members in registration;

means comprising a narrow elongated strip of conductive material disposed in a generally U-shaped configuration around and spaced generally parallel to a substantial portion of the periphery of said second coupling member on said window engaging surface coplanar with said second coupling member for forming a ground plane within said housing relative to said radiating element;

impedance matching means comprising an inductor within said housing connected between said second coupling member and a point on said U-configured strip of conductive material intermediate the ends thereof, said inductor having an inductive reactance at the operating frequency at least equal to said predetermined capacitive base reactance of said antenna; and

connection means comprising a coaxial cable extending into said housing and having within said housing a central conductor electrically connected to said inductor between the ends thereof and a shield conductor connected to said connection point on said strip; and

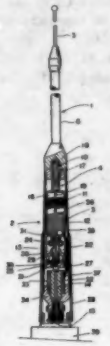
said impedance matching means establishing impedance-matched electrical communication between the antenna and the utilization device.

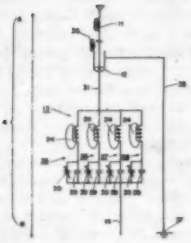
4,931,807

NON-STATIONARY ANTENNA WITH SLEEVE AND RESONANT CIRCUIT

Katsumi Naitou, Yawatahama, Japan, assignor to Nippon Tsushin Densen Company Ltd., Yawatahama, Japan

Filed Jun. 15, 1989, Ser. No. 366,519
Claims priority, application Japan, Mar. 28, 1989, 64-76164
Int. Cl.[5] H01Q 9/04
U.S. Cl. 343—745 3 Claims





1. A non-stationary antenna, comprising:

a central antenna conductor having an upper antenna section and a lower antenna section, a part of said lower antenna section including a coaxial cable having an inner conductor and an outer sheath, said outer sheath having first and second ends;

a cylindrical metal sleeve encircling said lower antenna section;

said first end of said outer sheath of said coaxial cable not being electrically connected to any other elements and said second end of said outer sheath of said coaxial cable being connected to said cylindrical metal sleeve;

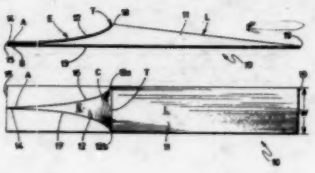
a resonator circuit arrangement placed in said lower antenna section, said resonator circuit arrangement including a plurality of parallel connected resonator circuits, each resonator circuit comprising a coil and a capacitor bank connected in series, each capacitor bank including a variable capacitor and a non-variable capacitor connected in parallel, said resonator circuit arrangement being an only electrical connection between said upper antenna section and said lower antenna section.

4,931,808

EMBEDDED SURFACE WAVE ANTENNA

Farzin Lalezari, Louisville; Michael G. Munson, and Theresa A. Cronin, both of Boulder, all of Colo., assignors to Ball Corporation, Muncie, Ind.

Filed Jan. 10, 1989, Ser. No. 295,423
Int. Cl.[5] H01Q *19/06, 13/24*
U.S. Cl. 343—753 **51 Claims**



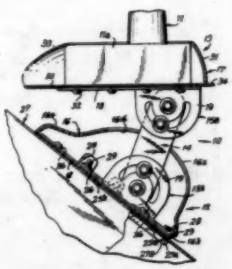
1. A broadband antenna device comprising two spaced apart conductive planar members, one member being a transition from a narrow portion to a wider portion according to a continuous function, said one member having an upward inclination away from the other of said conductive planar members and ending in a termination at the wider portion, a tapered lens material having a downward inclination from said termination toward said other of said conductive planar members to define a sloping surface therebetween for launching and receiving electromagnetic waves.

4,931,809

MOUNTING ASSEMBLY FOR SATELLITE TRANSMITTING ANTENNA

Rob R. Putman, Moorpark, Calif., and Kevin George, Clifton, N.J., assignors to Sony Corporation, Tokyo, Japan

Filed Jun. 6, 1988, Ser. No. 202,823
Int. Cl.[5] H01Q *1/12*
U.S. Cl. 343—882 **6 Claims**



1. A mounting assembly for supporting a satellite antenna on a mobile vehicle, comprising:

a base member having a lower mounting surface for fixed mounting against a surface of the mobile vehicle, and means directed upwardly from said lower mounting surface and defining a respective first pivot axis substantially parallel with said lower mounting surface;

an upper member having an upper surface for fixed mounting of the antenna thereagainst, and means directed downwardly from said upper surface and defining a respective second pivot axis substantially parallel with said upper surface;

a strut member pivotally connected, at spaced apart locations therealong, to said first and second pivot axes with said axes being parallel with each other so that said upper surface and said lower mounting surface can be adjusted relative to each other both angularly and in respect to the distance therebetween for ensuring that a mobile vehicle on which said base member is fixed does not interfere with an unimpeded line-of-sight from an antenna mounted on said upper member to a respective satellite;

said base member and said upper member including first and second brackets, respectively, which are of the same configuration and inverted relative to each other, and which define said mounting surface and said upper surface, respectively, at faces of said brackets directed away from each other, and first and second generally streamlined fairings secured on said first and second brackets, respectively, and substantially hiding said brackets from view.

4,931,810

INK-JET RECORDING SYSTEM

Kazuo Iwata, Yokohama; Osamu Nishiwaki, Atsugi, and Shinichi Tochihara, Hadano, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 136,716, Dec. 22, 1987, abandoned.
This application Jun. 23, 1989, Ser. No. 370,070
Claims priority, application Japan, Dec. 24, 1986, 61-309441; Dec. 4, 1987, 62-307282
Int. Cl.[5] G01D *15/16*; B41J *3/04*
U.S. Cl. 346—1.1 **34 Claims**

1. A multi-nozzle ink-jet recording process comprising the steps of:

ejecting ink droplets; and

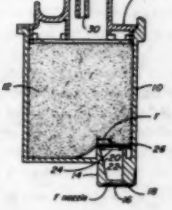
adhering said ink droplets on a recording medium at a recording density of at least 100 dots/mm^2 and 3.0×10^6pl/cm^2.

4,931,811

THERMAL INK JET PEN HAVING A FEEDTUBE WITH IMPROVED SIZING AND OPERATIONAL WITH A MINIMUM OF DEPRIMING

Bruce Cowger; Niels J. Nielsen, and John H. Dion, all of Corvallis, Oreg., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Jan. 31, 1989, Ser. No. 304,549
Int. Cl.[5] B41J *2/19*
U.S. Cl. 346—140 R **2 Claims**



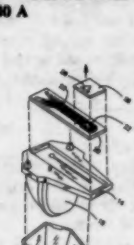
1. In combination, an ink jet pen having an ink reservoir and an ink jet thin film printhead and a standpipe interconnecting said reservoir and said printhead and having an air accumulating section adjacent said reservoir, said printhead has an orifice plate therein with orifii openings having a radius, r_{nozzle}, and said air accumulating section of said standpipe has a radius, r, which staisfies the equation: $r/r_{nozzle}>100$ and enables air bubbles to remain in said standpipe when said printhead is in operation whereby said air bubbles are deformed by the suction force generated by said printhead and allow ink to pass through said standpipe between said air bubbles and the walls of said standpipe and enable said ink jet pen to operate continuously without significant depriming due to air bubble blockage.

4,931,812

FLOW CONTROL SYSTEM FOR INK CARTRIDGES

John B. R. Dunn; Lowell R. McDaniel, both of Corvallis; Patrick W. Shelley, Albany, and Karen M. Lewey, Corvallis, all of Oreg., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Jul. 18, 1989, Ser. No. 381,446
Int. Cl.[5] G01D *15/18*
U.S. Cl. 346—140 A 20 Claims



1. A flow control unit for use in an ink cartridge having a reservoir maintained at a negative pressure in combination with printing means for withdrawing ink from said reservoir comprising:

a first conduit in fluid communication with said reservoir;

a second conduit positioned between and in fluid communication with said first conduit and said printing means;

a medial section positioned between said first conduit and said second conduit, said medial section comprising an opening therethrough; and

a spherical ink flow control member positioned within said second conduit and having a diameter greater than that of said opening in said medial section, said second conduit being sufficiently large to allow the free movement of said control member therein, said control member allowing ink to flow outwardly from said reservoir through said first conduit, medial section, and second conduit to said printing means, while preventing the reverse flow of air and ink into said cartridge and reservoir by blocking said opening in said medial section.

4,931,813

INK JET HEAD INCORPORATING A THICK UNPASSIVATED TAAL RESISTOR

Alfred I. Pan, Mountain View; Howard H. Taub, San Jose, and Harold W. Levie, Livermore, all of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Continuation of Ser. No. 99,428, Sep. 21, 1987, abandoned. This application Feb. 28, 1989, Ser. No. 317,106
Int. Cl.[5] B41J *2/05*
U.S. Cl. 346—140 R 7 Claims

1. A print head for a thermal ink jet printer comprising:

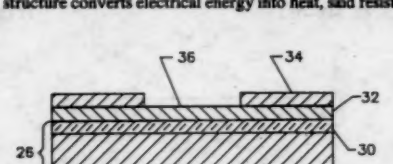
ink source means for supplying ink;

orifice means for directing ink expelled therethrough toward a recording medium;

channel means for conveying ink from said ink source to said orifice;

circuit means for supplying a current in response to a control signal; and

a resistor structure coupled to said circuit means so that when said circuit means supplies a current said resistor structure converts electrical energy into heat, said resistor



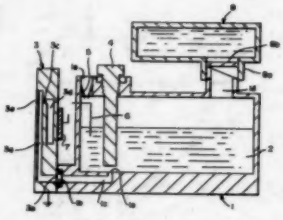
structure being arranged with respect to said channel means and said orifice means so that ink within said channel means can be expelled through said orifice in response to the generation of heat by said resistor structure, said resistor structure including a base structure having a substrate and a homogeneous TaAl resistive layer disposed to contact fluid within said channel means, said resistive layer being at least about 2000 Å thick.

4,931,814

INK SUPPLY DEVICE FOR INK JET PRINTER

Hisashi Yoshimura, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 84,588, Aug. 13, 1987, abandoned. This application Mar. 8, 1989, Ser. No. 320,930
Claims priority, application Japan, Aug. 13, 1986, 61-124350
Int. Cl.[5] G01D *15/16*; B41J *3/04*
U.S. Cl. 346—140 R 5 Claims



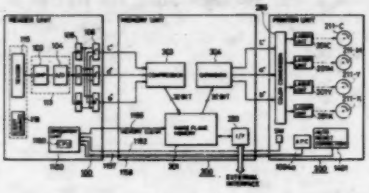
1. In an ink supply device for an ink jet printer for supplying ink from a tank through a passageway to a nozzle at normal pressure by utilizing capillary effect, the improvement wherein said tank is a closed container provided with an air intake opening which connects the interior of said tank with the atmosphere, said device further comprising valve means provided at said opening for allowing air to enter said tank therethrough but preventing air to leave said tank therethrough, and a cartridge which is a sealed container containing air and ink therein and having a tubular ink outlet provided with a cover, said tank being also provided with a tubular ink inlet member, said tubular ink outlet and said tubular ink inlet member being slidably engageable such that said cartridge is removably attachable to said tank and that the action of attaching said cartridge to said tank automatically causes said cover to be removed from said cartridge, raises pressure inside said tank and causes ink and air bubbles in said passageway to be pushed to said nozzle.

4,931,815

MULTIPLE IMAGE FORMING APPARATUS

Yukio Sato, Kawasaki; Masafumi Watuya; Hiroaki Ishii, both of Tokyo, and Yutaka Udagawa, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 307,232, Feb. 7, 1989, abandoned, which is a continuation of Ser. No. 38,308, Apr. 14, 1987, abandoned. This application Jun. 23, 1989, Ser. No. 370,077
Claims priority, application Japan, Apr. 15, 1986, 61-85090; Apr. 15, 1986, 61-85091; Jun. 2, 1986, 61-127607
Int. Cl.[5] G01D 15/00
U.S. Cl. 346—154 31 Claims



1. A multiple image forming apparatus comprising

image forming means for forming images respectively on plural recording members;

transfer means for transferring the images on said plural recording members onto a same recording medium;

control means for controlling said image forming means and said transfer means in such a manner as to form predetermined images respectively in areas of said recording medium divided in a direction substantially perpendicular to the transport direction of said recording medium;

measuring means for measuring positional errors by detecting the record positions of said predetermined images; and

regulating means for variably controlling the start timing of said image forming means according to the output of measurement of said measuring means.

4,931,816

INTERNAL PRESSURE ADJUSTING MECHANISM FOR UNDERWATER AND WATERPROOF PRODUCTS

Makoto Kamo, and Isamu Nakajima, both of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed May 30, 1989, Ser. No. 358,826
Claims priority, application Japan, May 30, 1988, 63-133719
Int. Cl.[5] G03B 17/08
U.S. Cl. 354—64 8 Claims

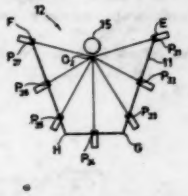
1. An internal pressure adjusting mechanism for an underwater and waterproof product comprising an air circulation passage for establishing communication between the interior of the product and an external atmosphere, and a water-repellent porous member in the passage, said water-repellent porous member permitting air to circulate through the passage while preventing water from passing therethrough.

4,931,817

STEREOPHOTOGRAPHIC PROCESS AND PROCESSING APPARATUS FOR PRODUCING WORKS OF SCULPTURE

Kimihiko Morioka, Tokyo, Japan, assignor to Rittaishashinzo Co., Ltd., Tokyo, Japan

Filed Oct. 20, 1988, Ser. No. 260,925
Claims priority, application Japan, Oct. 27, 1987, 62-270926
Int. Cl.[5] G03B 35/08; B44C 3/06; G02B 27/22
U.S. Cl. 354—113 2 Claims



1. A process of producing works of sculpture on a desired reduced scale, comprising the steps of:

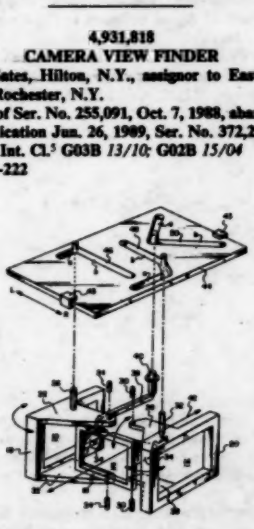
arranging a plurality of photographic cameras and arranging a plurality of optical projectors, each projector being loaded with a transparent screen having a plurality of parallel lines thereon, around an object to be photographed at a predetermined object distance; projecting the parallel lines of the transparent screen onto the object and photographing a striped pattern projected onto the object; arranging a second plurality of projectors around a mass of material to be molded, said second plurality of projectors having a reduced focal length and being positioned at an object distance proportional to the desired reduction scale; reducing photographic pictures taken by said cameras to obtain reduced scale pictures; projecting said reduced scale pictures by corresponding ones of said second plurality of projectors; and sculpting said mass of material to make the projected lines meet and coincide with each other to obtain a reduced scale sculpture.

4,931,818

CAMERA VIEW FINDER

Richard A. Gates, Hilton, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Continuation of Ser. No. 255,091, Oct. 7, 1988, abandoned. This application Jun. 26, 1989, Ser. No. 372,233
Int. Cl.[5] G03B 13/10; G02B 15/04
U.S. Cl. 354—222 8 Claims



1. Apparatus for selectively positioning one of at least three lenses into an optical path, said apparatus comprising:

means for independently supporting the lenses for movement between respective first positions where they are out of the optical path and respective second positions where they are in the optical path; and

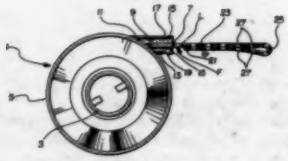
cam means for selectively positioning one of said lenses in its second position and for simultaneously positioning the other of said lenses in their first positions.

4,931,819

FILM CASSETTE AND METHOD OF ASSEMBLING THE SAME

William C. Atkinson, Webster, and Roger A. Fields, Pittsford, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jul. 14, 1989, Ser. No. 379,743
Int. Cl.[5] G03B *17/26*
U.S. Cl. 354—275 7 Claims



1. An improved film cassette wherein a filmstrip in roll form is stored within the cassette shell and has a leader that projects from an exterior end of a film passage slit in said cassette shell to permit the filmstrip to be drawn out of the shell, and wherein the improvement comprises:

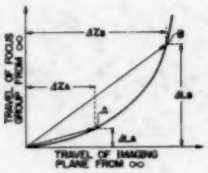
said leader having a forward edge portion that is folded back onto a successive portion of the leader to prevent the leader from being moved completely through the exterior end of said film passage slit into said cassette shell.

4,931,820

AUTO-FOCUS CAMERA

Yoshinori Matsuzawa, Hachioji, and Shinya Takahashi, Kodaira, both of Japan, assignors to Olympus Optical Company Ltd., Japan

Filed Aug. 25, 1988, Ser. No. 236,634
Claims priority, application Japan, Aug. 25, 1987, 62-212363; Aug. 31, 1987, 62-217733; Aug. 31, 1987, 62-217734
Int. Cl.[5] G03B *3/10*
U.S. Cl. 354—402 29 Claims



1. An auto-focus camera comprising

detection means for detecting a focal offset between a position of an imaging plane on an optical axis where light from an object being photographed is image through a taking lens and a position of a film surface on the optical axis;

table means for providing drive values specific to a particular taking lens, said drive values each being associated with a given offset value and a lens position value;

offset determining means employing the detected focal offset for reference to data which is specific to a particular taking lens and for determining a focus lens drive value in accordance with such data and the focal offset in a single step;

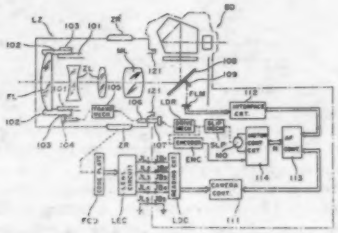
and drive means for moving the focus lens in accordance with the drive value.

4,931,821

AUTOMATIC FOCUS ADJUSTING APPARATUS

Masataka Hamada; Tokuji Ishida, both of Osaka, and Yasuaki Akada, Sakai, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Jun. 19, 1989, Ser. No. 368,417
Claims priority, application Japan, Jan. 14, 1985, 60-11250; Jan. 17, 1985, 60-7179
Int. Cl.[5] G03B *3/00*
U.S. Cl. 354—402 5 Claims



1. An automatic focus adjusting apparatus for automatically adjusting a focus condition of an objective lens, comprising:

photodetecting means for detecting a light intensity distribution of an image of an object to be focused, to produce a light intensity distribution signal representing the detected light intensity distribution;

calculating means for calculating a defocus amount of the objective lens in accordance with the light intensity distribution signal;

discriminating means for discriminating whether or not the defocus amount calculated by the calculating means is smaller than a predetermined amount;

lens position detecting means for detecting whether or not the object lens is located at its infinity focusing position, and

enlarging means for enlarging the predetermined amount when the lens position detecting means for detecting determines that the objective lens is located at its infinity focusing position.

4,931,822

FOCUS DETECTING APPARATUS

Shozo Yamano, Tokyo, Japan, assignor to Nikon Corporation, Tokyo, Japan

Filed Oct. 19, 1989, Ser. No. 424,177
Claims priority, application Japan, Oct. 24, 1988, 63-267621
Int. Cl.[5] G03B *3/00*
U.S. Cl. 354—402 8 Claims

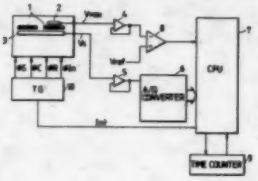
1. A focus detecting apparatus in a camera comprising:

quantity-of-light detecting means producing an output in conformity with the intensity of an incident light from an object to be photographed;

a charge accumulation type light receiving device having a plurality of light receiving elements, each of said light receiving elements receiving the light from the object to be photographed and accumulating therein charges conforming to said light, said light receiving device outputting a plurality of accumulation signals conforming to said plurality of light receiving elements; and

calculating means for effecting the focus detection of a photo-taking lens on the basis of the plurality of accumulation signals of said light receiving device;

said calculating means controlling the charge accumulation time of said light receiving device in conformity with the output from said quantity-of-light detecting means when



said focus detecting apparatus effects the first focus detection after the starting thereof, and controlling the Nth charge accumulation time of said light receiving device on the basis of the plurality of accumulation signals obtained by the N−1th focus detection when said focus detecting apparatus effects the Nth (N≧2) focus detection after the starting thereof.

4,931,823

MULTIMODE CAMERAS

Yukio Nakajima, Kanagawa, and Minoru Hara, Hachioji, both of Japan, assignors to Olympus Optical Co., Ltd., Japan

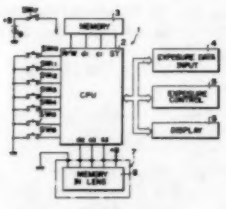
Continuation of Ser. No. 27,868, Mar. 19, 1987, Pat. No. 4,814,812. This application Mar. 13, 1989, Ser. No. 322,662

Claims priority, application Japan, Mar. 31, 1986, 61-073891

The portion of the term of this patent subsequent to Mar. 21, 2006, has been disclaimed.

Int. Cl.[5] G03B *7/00*

U.S. Cl. 354—412 **7 Claims**



1. A camera system, including a camera for use with any one of a plurality of interchangeable lenses, comprising:

(a) variable setting means for variably setting a value associated with the taking of a picture;

(b) signal output means for outputting a memory signal in order to store said variable set value in a memory area;

(c) input means for inputting a different identification number assigned to each interchangeable lens;

(d) memory means for storing said identification number inputted by said input means and said value set by said setting means in association with each other;

(e) selection means for inputting an identification number responsive to the interchangeable lens mounted upon the camera; and

(f) means for reading out from said memory means the variable set value associated with the identification number inputted by said selection means.

4,931,824

CAMERA BOOSTING CIRCUIT

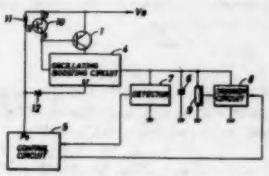
Hiroshi Takahashi, Hachioji, Japan, assignor to Konica Corporation, Tokyo, Japan

Filed Feb. 28, 1989, Ser. No. 316,640

Claims priority, application Japan, Mar. 1, 1988, 63-45850

Int. Cl.[5] G03B *7/26*

U.S. Cl. 354—484 **3 Claims**



1. A camera boosting circuit comprising:

an oscillating transistor for converting a DC voltage of a camera power source battery into an AC voltage;

a depletion FET connected in an emitter-base path of said oscillation transistor;

oscillating boosting means for converting the DC voltage into the AC voltage together with said oscillating transistor, boosting the AC voltage using a transformer, and obtaining a high DC voltage by rectifying the boosted AC voltage; and

control means for controlling an oscillating operation of said transistor by ON/OFF operation of said FET.

4,931,825

IMAGE RECORDING APPARATUS PROVIDED WITH EXPOSURE UNIT USING CATHODE RAY TUBE

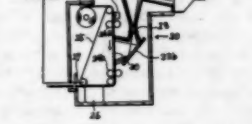
Makoto Suzuki; Shigeru Mizuno; Kazuo Sangyoji, and Osamu Takagi, all of Nagoya, Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Jun. 7, 1988, Ser. No. 203,103

Claims priority, application Japan, Jun. 9, 1987, 62-143475; Jun. 9, 1987, 62-143476; Jun. 26, 1987, 62-160789

Int. Cl.[5] G03G *21/00, 15/01*

U.S. Cl. 355—20 **4 Claims**



1. A copying apparatus for forming a visible image on a photosensitive sheet comprising;

a sheet handling unit having a light receiving portion for feeding said photosensitive sheet to said light receiving portion and for discharging said sheet therefrom;

an exposure unit comprising a cathode ray tube which projects its displaying image onto said wherein said exposure unit further comprises an optical lens disposed between said cathode ray tube and said light receiving portion, and wherein said cathode ray tube has a screen whose edge portion provides brightness higher than that of the remaining portion of said screen. photosensitive

sheet when said sheet is at said light receiving portion, said cathode ray tube having display image scrolling function;

controlling means connected between said sheet handling unit and said cathode ray tube for controlling a speed of said scrolling in synchronization with a speed of feeding of said photosensitive sheet, so that a continuous latent image is provided on said photosensitive sheet in accordance with scrolling display image from said cathode ray tube; and,

an image developing device for developing said latent image into said visible image.

4,931,826

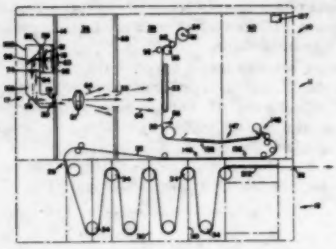
PHOTOGRAPHIC PRINTER-PROCESSOR

Orren J. Lucht, Farmington, and Charles R. Lucht, Bloomington, both of Minn., assignors to Castle Rock Manufacturing, Inc.

Filed Dec. 1, 1988, Ser. No. 278,668

Int. Cl.[5] G03B *29/00, 27/44, 27/58, 27/60*

U.S. Cl. 355—28 **41 Claims**



1. An apparatus for printing and processing photographs, comprising:

(a) a light source for projecting a light beam through a negative and toward light-sensitive photographic print materials;

(b) a platen for supporting said print material in a flat configuration during exposure to the light;

(c) means for processing the print material, said processing means having an entrance and an exit and processor drive means;

(d) means for transporting the print material from said platen to said entrance of said processing means, said transporting means being enclosed so as to prevent light from reaching the print material, said transporting means including accumulation means between said platen and said processing means for accumulating the print material before it enters said processing means, wherein said printing and processing apparatus is a single structure; and

(e) cutter means for cutting the print material at selected intervals to create a leading edge, said cutter means cooperatively located between said platen and said transporting means, said transporting means being arranged and configured to control said leading edge of the print material, whereby manual threading of the print material is not required.

4,931,827

PHOTOMETER FOR REPRODUCTION MACHINE

Tatsuo Yoshino, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Oct. 11, 1988, Ser. No. 256,423

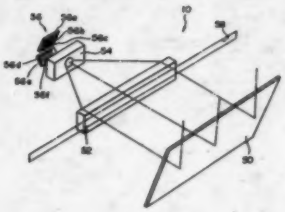
Claims priority, application Japan, Oct. 9, 1987, 62-255047

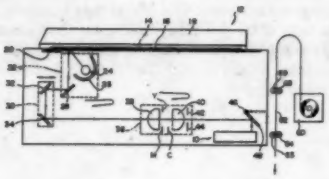
Int. Cl.[5] G03B *27/72*

U.S. Cl. 355—38 **14 Claims**

1. A photometer for a reproduction machine in which a document, illuminated by a light source, and a slit are relatively moved for scanning, to thereby make a photometric test on said document through said slit, comprising:

a condensing lens for condensing the reflected light from said document;





diffusion means for diffusing the light condensed by said condensing lens; and

detection means for detecting the light diffused by said diffusion means.

4,931,828

READER-PRINTER

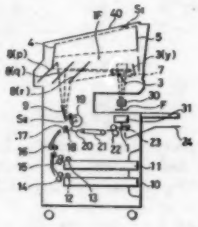
Masafumi Fujita; Takao Saijo, and Kazuhiko Tezuka, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Dec. 16, 1988, Ser. No. 285,844

Claims priority, application Japan, Dec. 18, 1987, 62-32263; Dec. 18, 1987, 62-322264

Int. Cl.[5] G03B *13/28*

U.S. Cl. 355—45 **12 Claims**



1. A reader-printer capable of being changed over between a reader mode in which an image on a microfilm is projected on a screen and a printer mode in which the image is printed on a recording paper, said reader-printer comprising:

a plurality of paper feeding sections, each accommodating a recording paper of a different size;

retrieval means for retrieving a desired image out of a multiplicity of images recorded on a microfilm;

a plurality of sensors arranged in a line along a film transport direction for judging a frame size of the retrieved image,

said plurality of sensors being disposed in a position where all the sensors receive light having passed through an image area when an image at an exposure position has a first size, and where at least one sensor receives light having passed through an area including a blank portion between images when the image has a second size, each o said sensors having the same or less width than a width of said blank portion projected onto the sensor and being so arranged that an arrangement pitch thereof is the same or less than said width of said blank portion; distinguishing means for distinguishing signals of levels corresponding to the blank portion from signals of other levels, both of said signals being generated by said plurality of sensors; and

control means for judging a size of the retrieved image frame using a result of the distinguishing means an selecting a paper feeding section out of said plurality of paper feeding sections in accordance with a result of the judgment.

4,931,829

TRIMMING DEVICE FOR USE WITH PHOTOGRAPHIC PAPER PRINTER

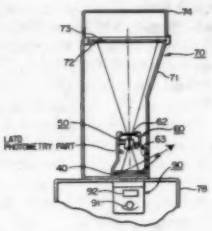
Haruo Hakamada, Hino, Japan, assignor to Konica Corporation, Tokyo, Japan

Filed Apr. 26, 1989, Ser. No. 344,102

Claims priority, application Japan, Apr. 27, 1988, 63-104937

Int. Cl.[5] G03B *27/53*

U.S. Cl. 355—68 **11 Claims**



1. A trimming device for use with a photographic printer comprising;

a fixed window means being unchangeable in size;

a variable window means having a movable window frame for changing a window size thereof;

each of said fixed window means and variable window means being symmetrically shaped in the optical axis of exposure light so that exposure light is projected through the smaller of said fixed window means and said variable window means;

a film guide means for guiding a film frame to be printed into said exposure light, said film guide means being adapted to allow a film frame to move in an X- direction corresponding to the lengthwise direction of said film and in a Y-direction corresponding to a widthwise direction of said film;

said movable window frame member having trimming frames movable in the X and Y direction adapted to change a window size in both the X and Y directions symmetrically in the optical axis of said exposure light, a trimming area determined by said movable window frame being regulated to become relatively similar for printing paper areas different in printing size;

wherein each printing area different in printing size has a basic magnification predetermined with respect to the fixed window of said fixed window means, and

wherein, when a trimming magnification is larger than a basic magnification of a printing area to be exposed, said trimming area is adjusted to have dimensions obtained by dividing the dimensions of the printing area in the X and Y direction by the trimming magnification, and when the trimming magnification is smaller than the basic magnification, said trimming area is adjusted to have dimensions not less than the dimensions of the fixed window.

4,931,830

PROJECTION EXPOSURE APPARATUS

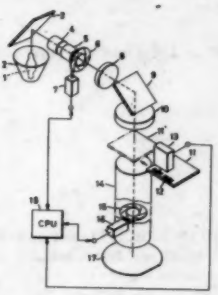
Kyoichi Suwa, Yokohama; Kazuo Ushida, Tokyo; Takeshi Suto, Funabashi; Masaomi Kameyama, Tokyo; Shigeru Hirukawa, Kashiwa, and Shinichi Nakamura, Kawaguchi, all of Japan, assignors to Nikon Corporation, Tokyo, Japan

Filed Aug. 7, 1989, Ser. No. 389,978

Claims priority, application Japan, Aug. 12, 1988, 63-201078

Int. Cl.[5] G03B *27/72*

U.S. Cl. 355—71 **19 Claims**



1. A projection exposure apparatus for projecting a fine pattern formed on a reticle onto a wafer, comprising:

an illuminating optical system for illuminating said reticle;

a projection optical system for projecting the pattern of said reticle onto said wafer;

variable diaphragm means provided in said projection optical system for varying the aperture thereof;

means for providing pattern information on the dimension of the pattern of said reticle; and

diaphragm control means for controlling the aperture of said variable diaphragm means, based on said pattern information, at an aperture capable of intercepting the diffracted light of a large diffraction angle among the diffracted light generated by said pattern illuminated by said illuminating optical system.

4,931,831

PHOTOGRAPHIC COPYING AND ENLARGING APPARATUS

Hugo Knecht, Schöfflisdorf, and René Lüscher, Kloten, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Nov. 22, 1988, Ser. No. 274,962

Claims priority, application Switzerland, Dec. 11, 1987, 4848/87

Int. Cl.[5] G03B *27/62*

U.S. Cl. 355—75 **26 Claims**

1. Photographic copying and enlarging apparatus comprising:

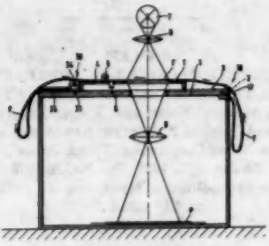
a work table;

a film stage located on the work table;

a transport means located on the work table for transporting film along a film transport path and including a film transport roller on the film stage;

a front clamping device located in front of a film transport path as viewed in a direction of film transport, for clamping one end of the film so that when its other end is

threaded into the transport means, the film forms a loop whereby a length of film which hangs laterally from the



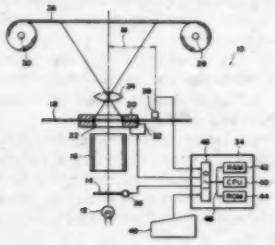
work table on a film inlet side is reduced by at least one half.

4,931,832

METHOD OF SPECIFYING FRAME NUMBER

Yuji Takenaka, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Apr. 27, 1989, Ser. No. 343,641
Claims priority, application Japan, Apr. 28, 1988, 63-106106
Int. Cl.[5] G03B 27/32, 27/52
U.S. Cl. 355—77 10 Claims



1. A method of specifying each of frame numbers given to image frames of an elongated photographic film when the film is fed to be positioned in a printing position at which the film is to be subjected to printing, comprising the steps of:

reading frame number information means provided on the photographic film;

setting position specifying areas at even intervals in the longitudinal direction of the film to include in said areas frame numbers recorded at constant intervals in the longitudinal direction of the film, the frame number within one of said position specifying areas being specified as the frame number of one of the image frames if the center of said one image frame is present in said one position specifying area; and

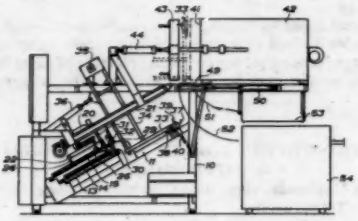
setting non-specifying areas which are in the vicinity of the boundaries of said position specifying areas but which do not belong to any of the frame numbers, the frame number of one of said image frames whose center is present within one of said non-specifying areas being specified by referring to the frame numbers of the image frames ahead of and behind said one image frame.

4,931,833

AUTOMATIC PROCESS LINE

Ben Elwing, Gislaved, Sweden, assignor to Johnny Persson, Nassjo, Sweden

PCT No. PCT/SE88/00440, § 371 Date Apr. 27, 1989, § 102(e) Date Apr. 27, 1989, PCT Pub. No. WO89/02097, PCT Pub. Date Mar. 9, 1989
PCT Filed Aug. 29, 1988, Ser. No. 348,577
Claims priority, application Sweden, Aug. 27, 1987, 8703318
Int. Cl.[5] G03B 27/04
U.S. Cl. 355—85 8 Claims



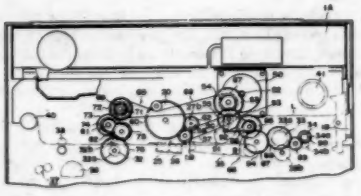
1. Automatic process line for exposing photosensitive printing plates with a film and a mask, if any, lying thereon, in a light box (42), characterized by magazines (13, 14, 15) for plate, film and mask disposed one above the other in said order from the top downwards, displaced in stepped relationship to each other at one side thereof with the lowermost magazine (13) projecting furthest, means (20) for picking up plate, film and mask separately at said one side and for picking up the plate also at the opposite side and for displacement thereof stepwise from the pick up position to a deposit position at said one side of the magazines as well as deposition of plate, film and mask in registered position one on top of the other, and a transfer member (33) for receiving plate, film and mask in the deposit position and transferring them to a light box (42) with plate, film and mask in exposure position.

4,931,834

IMAGE FORMING APPARATUS

Takayuki Suga, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Oct. 25, 1989, Ser. No. 426,592
Claims priority, application Japan, Oct. 31, 1988, 63-273056
Int. Cl.[5] G03G 15/00, 21/00
U.S. Cl. 355—200 8 Claims



8. An image forming apparatus comprising:

a rotatable image carrier;

drive means including a drive source, for rotating the image carrier in a forward direction for image formation, and rotating the carrier in reverse for a predetermined amount after the image formation;

driving force transmission mean for transmitting the driving force of the drive source to a driven portion other than the image carrier when the carrier is being rotated forward,

and cutting off the driving force from the driven portion when the carrier is being rotated in reverse;

a first unit holding the image carrier and the drive means; and

a second unit holding the driven portion,

said first unit being movable between an operative position for image formation, in which the first unit is in engagement with the second unit, and a nonoperative position, in which the first unit is disengaged from the second unit,

said transmission means including a first gear attached to the first unit and rotated forwardly and reversely in synchronism with the image carrier by the drive source, a second gear attached to the second unit and in engagement with the driven portion, an intermediate gear provided in the first unit, in mesh with the first gear, and capable of meshing with the second gear, and supporting means for supporting the intermediate gear so that the intermediate gear is subjected a force in the direction for engagement with the second gear while the first gear is forwardly rotating, and that the intermediate gear is subjected a force in the direction for disengagement from the second gear while the first gear is reversely rotating,

wherein the intermediate gear and the second gear are disengaged from each other when the first unit is shifted to the nonoperative position.

4,931,835

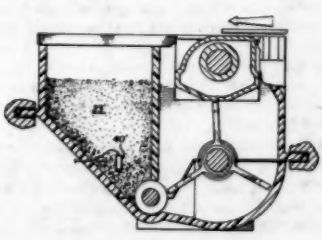
APPARATUS FOR MONITORING DEVELOPER MIXTURE

Joanne M. Higgins, and Michael Mosehauer, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Nov. 14, 1988, Ser. No. 270,586

Int. Cl.[5] G03G *21/00*

U.S. Cl. 355—203 **30 Claims**



1. In an electrostatographic reproduction machine comprising means for contacting an electrostatic image-bearing surface with a developer mixture of toner and carrier particles to apply toner to such surface to render the electrostatic image visible, an improved toner concentration monitor comprising:

a resistive element in heat transfer contact with a toner composition;

means for passing electrical current through said resistive element whereby said resistive element is heated and transfers heat to its surroundings at a rate dependent upon the heat transfer characteristics of said surroundings; and

means for measuring the electrical power into said resistive element, whereby said power is a function of toner concentration.

4,931,836

SCANNING OPTICAL DEVICE HAVING AT LEAST ONE RECIPROCATING OPTICAL ASSEMBLY

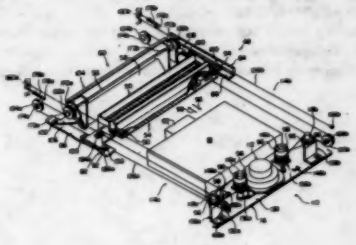
Tetsuya Matsushita, Nagasaki, and Akira Nakakuma, Takaishi, both of Japan, assignors to Mita Industrial Co., Ltd., Osaka, Japan

Filed Jun. 28, 1988, Ser. No. 213,288

Claims priority, application Japan, Jun. 30, 1987, 62-161284; Jul. 6, 1987, 62-167052; Oct. 19, 1987, 62-261791

Int. Cl.[5] G03G *15/04, 27/50*

U.S. Cl. 355—233 **16 Claims**



1. A scanning optical device comprising a first optical element assembly having front and rear sides; a second optical element assembly having front and rear sides, said assemblies mounted in said device so as to be reciprocally movable therein; and driving means for reciprocating said first and said second optical element assemblies, said driving means including a front side power transmission mechanism having a plurality of pulleys and a wire wrapped around the pulleys, said front side power transmission mechanism drivingly connected to said first and said second optical element assemblies at the front sides thereof, a rear side power transmission mechanism including a plurality of pulleys and a wire wrapped around the pulleys of said rear side power transmission mechanism, said rear side power transmission mechanism drivingly connected to said first and said second optical element assemblies at the rear sides thereof, and a common driving source drivingly connected to said front and said rear side power transmission mechanisms, said front and said rear side power transmission mechanisms including respective input wire drums rotatably mounted in the device about respective nearly vertically extending central axes, the common driving source drivingly connected to each of said output wire drums, and said wires being respectively wrapped around said input wire drums a plurality of turns in said front and said rear power transmission mechanisms.

4,931,837

REMOVABLE DEVELOPING UNIT FOR AN ELECTROSTATIC COPIER AND LOCKING DEVICE THEREFOR

Yasuo Abuyama, Ebina; Fumito Ide, Zama; Osamu Hamasaka, Yokohama, and Takeshi Sanbayashi, Tokyo, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 168,574, Mar. 7, 1988, abandoned, which is a continuation of Ser. No. 916,103, Oct. 7, 1986, abandoned, which is a division of Ser. No. 727,859, Apr. 26, 1985, abandoned. This application Feb. 14, 1989, Ser. No. 309,912

Claims priority, application Japan, Apr. 27, 1984, 59-85650

Int. Cl.[5] G03G *15/06*

U.S. Cl. 355—245 **8 Claims**

1. An image-forming apparatus comprising:

a housing;

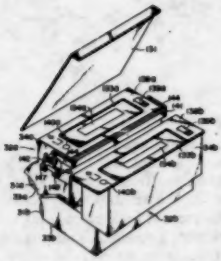
an image carrier, provided in said housing, for forming an electrostatic latent image on a surface thereof;

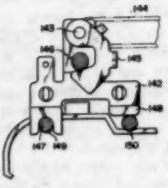
a developing device for developing the latent image formed

on the surface of the image carrier, said developing device including first developing means for developing the latent image by means of a first developing agent, and second developing means for developing the latent image by means of a second developing agent, at least one of said first and second developing means being removably set in said housing;

locking means for locking the position of said at least one of said first and second developing means with respect to the housing, said at least one of said first and second developing means being allowed to perform a developing operation while simultaneously being locked in position by said locking means; and

a unitary handle for moving said locking means between a locked position and an unlocked position at which said developing means can be removed from said housing;





said housing having an opening through which said at least one of said first and second developing means is taken out of the housing, said unitary handle being located along side walls of said at least one of said first and second developing means when said locking means is at the locked position, and being raised toward said opening when said locking means is at the unlocked position, said at least one of said first and second developing means being removed from said housing through said opening by pulling said handle when said locking means is at the unlocked position;

detecting means for detecting the presence or absence of said at least one of said first and second developing means in the housing; and

prohibiting means for prohibiting said image forming apparatus from being set in the developing-enabling state when said detecting means detects the absence of said at least one of said first and second developing means.

4,931,838

DEVELOPING APPARATUS AND PROCESS CARTRIDGE HAVING THE SAME

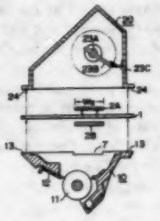
Yutaka Ban, Tokyo, and Toshiaki Nagashima, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

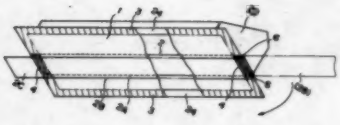
Filed Feb. 23, 1989, Ser. No. 313,897

Claims priority, application Japan, Feb. 24, 1988, 63-42578; Mar. 2, 1988, 63-49289

Int. Cl.[5] G03G *15/06*

U.S. Cl. 355—260 **42 Claims**





1. A developing apparatus comprising:

a first container portion for containing a developer;

a second container portion within which a developer bearing member for bearing and conveying the developer supplied from said first container portion and supplying the developer to an image bearing member is arranged;

a seal film for partitioning said first and second container portions;

a flexible tape having a first portion extending along one surface of said seal film and a second portion bent from said first portion and extending along the other surface of said seal film; and

said seal film being tearable along said first portion of said flexible tape by pulling said second portion of said flexible tape to form a passage opening through which the developer is shifted from said first container portion to said second container portion through said seal film.

4,931,839

TRANSFER SYSTEM FOR ELECTROPHOTOGRAPHIC PRINT ENGINE

E. Neal Tompkins, Atlanta; Jack N. Bartholmae, Duluth; Peter A. Zaber, Norcross, and Kirk W. Charles, Atlanta, all of Ga., assignors to Colorocs Corporation, Norcross, Ga.

Filed Mar. 11, 1988, Ser. No. 166,674

Int. Cl.[5] G03G *15/14, 15/01*

U.S. Cl. 355—277 **45 Claims**

1. An improved transfer mechanism for use in an electrophotographic print engine comprising in combination:

a web for carrying a developed toner image thereon, said web being characterized by a surface resistivity in the range of 10^7 to 10^{10} ohms per square;

a first roller disposed on a first side of said web at a transfer station;

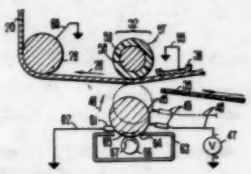
a second roller disposed on a second side of said web, said second side being opposite said first side;

roller control means for selectively moving said second roller between a first position at which said second roller contacts said web and urges same against said first roller and a second position at which said second roller does not contact said web;

a grounding plate disposed away from said transfer station along a direction of travel of said web and in contact with said web;

potential control means for maintaining said grounding plate at a first predetermined electrical potential with respect to a predetermined reference potential and for maintaining said second roller at a second predetermined electrical potential with respect to said predetermined reference potential when said second roller is in said first position; and

transfer control means for detecting when said developed



toner image is approaching said transfer station and for placing an image receptor between said first and second rollers and causing said roller control means to move said second roller to said first position in response thereto.

45. In a color photographic print engine of the type including a photoconductor for sequentially exposing at an exposure station, developing, and carrying a plurality of separated developed toner images to a transfer station in which each of said separated developed toner images is transferred to an image receiving member, each of said developed toner images being formed sequentially by one of a first toner material, a second toner material, and a third toner material, each of said toner materials being characterized by a respective one of a plurality of predetermined triboelectric charge characteristics;

the improvement wherein:

the average triboelectric charge characteristic for said second toner material is greater than the average triboelectric charge characteristic for said first toner material; and

the average triboelectric charge characteristic for said third toner material is greater than said average triboelectric charge characteristic for said second toner material.

4,931,840

CLEANING DEVICE

Misao Tanzawa, Kawasaki, and Shuichi Endo, Tokyo, both of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Continuation of Ser. No. 167,298, Mar. 11, 1988, abandoned, which is a continuation of Ser. No. 924,830, Oct. 30, 1986, Pat. No. 4,768,062. This application Jun. 28, 1989, Ser. No. 372,117

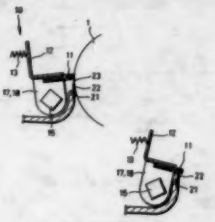
Claims priority, application Japan, Oct. 30, 1985, 60-241299; Oct. 30, 1985, 60-168786

The portion of the term of this patent subsequent to Aug. 30, 2005, has been disclaimed.

Int. Cl.[5] G03G *21/00*

U.S. Cl. 355—298 **2 Claims**

1. A cleaning device comprising a cleaning blade adapted to be in contact with an image carrier on the trailing side thereof for removing residual toner on a surface of said image carrier, a rotatable blade holder for supporting said cleaning blade and a polygonal member rotatable for moving toner scraped from said surface of said image carrier to a toner recovery means comprised by a toner carrier, said polygonal member composed of a plurality of sections arranged along an axis thereof,



at least one of said sections having ridgelines shifted from those of the remaining sections.

4,931,841

ELECTROPHOTOGRAPHIC APPARATUS HAVING ABRADED SURFACE PHOTOSENSITIVE MEMBER

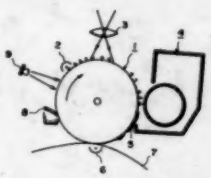
Toshiyuki Yoshihara, Mitaka, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 23, 1987, Ser. No. 137,104

Claims priority, application Japan, Dec. 27, 1986, 61-309219

Int. Cl.[5] G03G *15/00, 5/00*

U.S. Cl. 355—299 **12 Claims**



1. An electrophotographic apparatus comprising an electrophotographic photosensitive member and means for applying an electrophotographic cycle to the electrophotographic photosensitive member, wherein said means for applying an electrophotographic cycle includes abrasion means comprising a cleaning blade, wherein the photosensitive member is in the form of a cylinder having a diameter of 60 mm or less and comprises a laminated photosensitive surface layer including a charge generation layer and a charge transport layer, the charge generation layer having a thickness of 5 μm or less, and wherein the abrasion means causes an abrasion of the surface layer of the photosensitive member at a rate of 250 Å or more per 1000 electrophotographic cycles applied to the photosensitive member.

4,931,842

COLOR COPIER WITH CONSTANT OUTPUT RATE

Gregory P. Mahoney, Fairport, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 31, 1989, Ser. No. 401,393

Int. Cl.[5] G03G *21/00*

U.S. Cl. 355—317 **12 Claims**

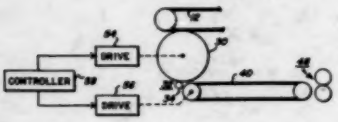
1. A sheet transport system for use with printers, copiers, and like devices which have a transfer station where developed images are transferred to a sheet medium, and a fusing station where the transferred images are fused to the sheet medium, said transport system comprising:

means for conveying the sheet from the transfer station to the fuser station;

means for controlling the movement of said conveying means; and

means for synchronizing the converging means with the

delivery of sheets from the transfer station such that the delivery of sheets to said fuser station is at a constant rate



even when the transfer station delivers sheets at a non-constant rate.

4,931,843

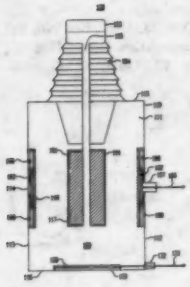
HIGH VOLTAGE MEASUREMENT CAPACITOR

Bernhard Goetz, 55 W. 14th St., New York, N.Y. 10011

Continuation-in-part of Ser. No. 259,247, Oct. 18, 1988, Pat. No. 4,879,628. This application Jul. 25, 1989, Ser. No. 385,232

Int. Cl.[5] H01G *4/08, 4/04*

U.S. Cl. 361—323 **20 Claims**



1. A capacitor for high voltage measurements comprising:

a hollow housing defining a cavity:

a high voltage (HV) electrode disposed in the housing, a HV bushing attached to the housing and first and second HV leads introduced into the housing via the HV bushing, wherein an internal end of the first HV lead couples to the HV electrode and an external end of the first HV lead terminates as a first HV connection, the internal end of the second HV lead couples to one end of a primary lead and the external end of the second HV lead terminates as a second HV connection electrically insulated from said first HV connection, wherein another end of the primary lead is electrically connected either to the internal end of said first HV lead or to said HV electrode, said first HV lead being hollow and including a reservoir formed at the external end thereof, and wherein the HV electrode is hollow and said second HV lead is insulated and routed through said first HV lead,

a low voltage (LV) electrode disposed in the housing an encompassing the HV electrode, a LV bushing attached to the housing and a LV lead introduced into the cavity via the LV bushing, wherein the internal end of the LV lead couples to the LV electrode and an external end of the LV lead forms a LV terminal;

a current transformer situated within said cavity and formed of a core, the primary lead which is oriented to pass through said core, and a secondary winding wound around said core;

leads for routing a current signal appearing on said secondary winding from the cavity; and

a non-gaseous dielectric material filling the cavity including the interelectrode gap between the HV electrode and the LV electrode.

4,931,844

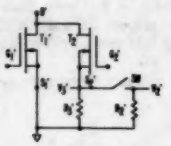
HIGH POWER TRANSISTOR WITH VOLTAGE, CURRENT, POWER, RESISTANCE, AND TEMPERATURE SENSING CAPABILITY

Nathan Zommer, Palo Alto, Calif., assignor to IXYS Corporation, San Jose, Calif.

Continuation-in-part of Ser. No. 165,692, Mar. 9, 1988, abandoned. This application Jul. 22, 1988, Ser. No. 223,059

Int. Cl.[5] H01L *29/78*

U.S. Cl. 357—23.4 **11 Claims**



1. A power MOSFET comprising:

a volume of semiconductor doped to a first conductivity type;

first and second pluralities of MOSFET cells formed in respective first and second regions of said semiconductor volume, each MOSFET cell having a region doped to a second conductivity type opposite said first conductivity type and having a source region formed therein of said first conductivity type; and

a plurality of isolation cells formed in a third region of said semiconductor volume disposed between said first and second regions, said isolation cells each having a region of said second conductivity type, but no source region.

4,931,845

SEMICONDUCTOR MEMORY DEVICE HAVING AN OHMIC CONTACT BETWEEN AN ALUMINUM-SILICON ALLOY METALLIZATION FILM AND A SILICON SUBSTRATE

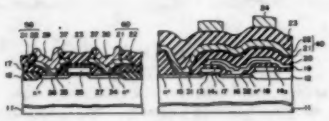
Taiji Ema, Kawasaki, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed Oct. 31, 1988, Ser. No. 264,857

Claims priority, application Japan, Nov. 5, 1987, 62-278286

Int. Cl.[5] H01L *23/48, 29/04, 29/78, 27/02*

U.S. Cl. 357—71 **10 Claims**



1. A semiconductor memory device comprising a memory cell portion and a peripheral circuit portion which are provided on a silicon substrate,

the memory cell portion comprising a first insulation film formed on the silicon substrate; and a first metallization film formed on the first insulation film, the first metallization film including a polysilicon film and a metal silicide film which are stacked in this sequence,

the peripheral circuit portion comprising a second insulation film having a contact hole formed on the silicon substrate; a barrier layer formed in the contact hole having a layer structure which is the same as that of the first metallization film and which is formed at the same time as forming

the first metallization film; and a second metallization film of an alloy of aluminum and silicon which overlies the barrier layer in the contact hole.

4,931,846

VERTICAL MOSFET HAVING VOLTAGE REGULATOR DIODE AT SHALLOWER SUBSURFACE POSITION

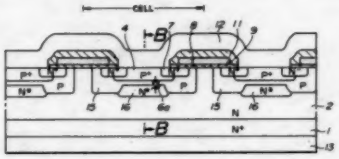
Teruyoshi Mihara, Yokosuka, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan

Filed Apr. 25, 1988, Ser. No. 185,387

Claims priority, application Japan, May 29, 1987, 62-133960

Int. Cl.[5] H01L *27/00*

U.S. Cl. 357—23.4 **1 Claim**



1. A vertical MOSFET device, comprising:

a first substrate layer of a first conductivity type formed in a semiconductor substrate and including a first major surface of the substrate;

an insulated gate electrode formed above said first surface of said substrate;

a gate insulating layer insulating the gate electrode from the substrate;

a source region of said first conductivity type extending into the substrate from said first surface;

a channel region of second conductivity type formed in said first substrate layer so as to surround said source region and separate said source region from said first substrate layer, said channel region comprising a deep subregion formed under said insulating gate electrode so that a conducting channel can be induced in said deep subregion immediately below said gate electrode, between said source region and said first substrate layer, and a shallow region surrounded by said deep subregion and shallower from said first surface than said deep subregion; and

a highly doped underlying layer of said first conductivity type formed under said shallow subregion in contact with said shallow subregion so as to form a p-n junction between said underlying layer and said shallow subregion for preventing a potential of said first substrate layer from exceeding a predetermined value, said p-n junction being formed at a position shallower from said first surface than said deep subregion;

wherein, the impurity concentration of said shallow subregion is higher than that of said deep subregion and the impurity concentration of said underlying layer is higher than that of said first substrate layer.

4,931,847

FLOATING GATE MEMORY WITH SIDEWALL TUNNELLING AREA

Giuseppe Corda, Saronno, Italy, assignor to SGS-Thomson Microelectronics S.p.A., Italy

Continuation of Ser. No. 64,378, Jun. 22, 1987, abandoned. This application Jul. 14, 1989, Ser. No. 379,706

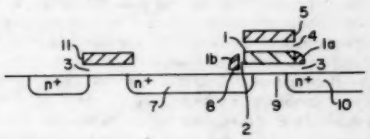
Claims priority, application Italy, Jun. 27, 1986, 83629 A/86

Int. Cl.[5] H01L *27/04, 29/78;* G11C *11/40*

U.S. Cl. 357—23.5 **11 Claims**

1. An electrically alterable, nonvolatile, flowing gate type memory device, comprising a substrate (2) of semiconductor material having a channel region (9) of a first type of conductivity between a first (10) and a second region (7) of a second type of conductivity, formed at the surface of said semiconductor substrate, said channel region providing a region within the semiconductor capable of passing an electric current between said first and said second region, a first level of patterned conducting material, constituting said floating gate (1), extending over said channel region (9), substantially between said first (10) and said second region (7) and electrically insulated by means of a first layer (3) of dielectric material from said semiconductor substrate and by means of a second layer (4) of dielectric matcrial from a second level of patterned conducting material, constituting a control gate (5), overlying said floating gate (1) and which further includes

a tunnel area defined on the surface of one of said first (10) and second (7) regions of the semiconductor substrate,



said tunnel area being bordered on one side by the base of a portion of the length of a side wall of said floating gate (1) and being covered with a third layer (8) of dielectric material thinner than said first layer (3) of dielectric material;

a tapered, lateral, seamlike appendix (1*b*) of conducting material juxtaposed along said portion of the length of the side wall of said floating gate (1), the base of said juxtaposed, tapered, lateral, seamlike appendix (1*b*) of conducting material abutting on the surface of said third layer (8) of dielectric material covering said tunnel area;

said seamlike appendix (1b) being electrically connected to said patterned first level of conducting material constituting said floating gate (1).

4,931,848

THYRISTOR HAVING INCREASED DI/DT STABILITY

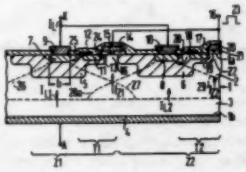
Helmut Herberg, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Aug. 30, 1985, Ser. No. 770,887

Claims priority, application Fed. Rep. of Germany, Sep. 27, 1984, 3435550

Int. Cl.[5] H01L *29/78*

U.S. Cl. 357—23.4 **4 Claims**



1. A thyristor, comprising:

a semiconductor body having a first conductivity type first emitter provided with a first contact at a first principal surface of the semiconductor body;

a second conductivity type base adjacent to the first emitter;

a second conductivity type second emitter provided with a second contact at a second principal surface of the semiconductor body;

a first conductivity type second base adjacent to the second emitter and separated from the first base by pn-junction;

the first emitter comprising a plurality of emitter regions each provided with a contact, the contacts being con-

nected to one another in an electrically conductive fashion;

the first base comprising a plurality of island-shaped base regions each having a respective one of said emitter regions inserted therein;

each of the island-shaped base regions having at least one field effect transistor allocated to it;

said field effect transistor being formed of a source region of first conductivity type inserted in the base region, a portion of the second base extending up to the first principal surface forming a drain region, and an edge zone of the island-shaped base region extending up to the first principal surface between the portion of the second base and the source region, a gate electrode covering said edge zone and separated from the first principal surface by a thin electrically insulating layer, and the source region being provided with an electrically conductive coating which also contacts the island-shaped base region;

gate electrodes of all field effect transistors being connected to a common gate terminal; and

a width of one of the emitter regions measured in a direction toward a neighboring emitter region being smaller by an order of magnitude than a lateral distance between these two emitter regions.

4,931,849

SEMICONDUCTOR MEMORY DEVICE WITH IMPROVED CAPACITOR STRUCTURE

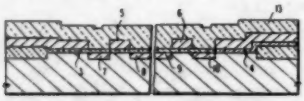
Junji Tajima, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Jul. 18, 1988, Ser. No. 220,273

Claims priority, application Japan, Jul. 16, 1987, 62-178260

Int. Cl.[5] H01L *27/04*; G11C *11/40*

U.S. Cl. 357—23.6 **8 Claims**



1. A semiconductor device comprising a semiconductor substrate, a first capacitor formed on said semiconductor substrate, said first capacitor including a first surface portion of said semiconductor substrate, a first dielectric layer formed on said first surface portion and a first conductive layer formed on said first dielectric, a second capacitor formed on said semiconductor substrate, said second capacitor including a second surface portion of said semiconductor substrate, a second dielectric layer formed on said second surface portion and a second conductive layer formed on said second dielectric layer, said second surface portion having substantially the same pattern and size as said first surface portion, said second dielectric layer having a smaller value of dielectric constant than said first dielectric layer, whereby a capacitance ratio of said second capacitor to said first capacitor is substantially determined according to a dielectric constant ratio of said second dielectric layer to said first dielectric layer.

4,931,850

SEMICONDUCTOR DEVICE INCLUDING A CHANNEL STOP REGION

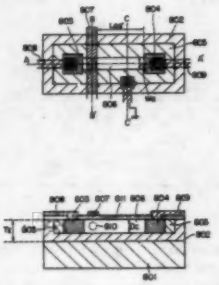
Takahiro Yamada, Hirakata, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Continuation of Ser. No. 251,005, Sep. 27, 1988, abandoned, which is a continuation of Ser. No. 881,101, Jul. 2, 1986, abandoned. This application Jun. 21, 1989, Ser. No. 370,082

Claims priority, application Japan, Jul. 5, 1985, 60-148710; Jul. 8, 1985, 60-149530; Sep. 19, 1985, 60-206812

Int. Cl.[5] H01L *29/78, 29/06, 27/02*

U.S. Cl. 357—23.11 **6 Claims**



1. A semiconductor device exhibiting a nonsaturation current characteristic, comprising:

a semiconductor substrate of a first conductivity type and having a first impurity concentration;

a semiconductor region of said first conductivity type formed in said semiconductor substrate, said semiconductor region having a second impurity concentration lower than said first impurity concentration;

source and drain regions of a second conductivity type formed in said semiconductor region and having said first impurity concentration, a source-drain channel serving as a carrier path being formed in said semiconductor region, said source-drain channel having a substantially perfect depletion state;

an insulated gate electrode interposed between said source and drain regions in the vicinity of said source region and outside said drain region; and

a channel stop region of said first conductivity type formed in said semiconductor region in the vicinity of said source-drain channel and under said gate electrode, said channel stop region having said first impurity concentration, the width of said source-drain channel immediately under said gate electrode being narrower than the width of said channel at any other part thereof, and the width of said channel, the impurity concentration of said semiconductor substrate and the impurity concentration of said semiconductor region having values such that a saddle-shaped potential barrier is created in said source-drain channel under said insulated gate electrode.

4,931,851

GAS SENSITIVE DEVICE

Alastair Sibbald, Maidenhead; Brian C. Webb, Sunbury; Ian Robins; John F. Ross, both of Hayes, and Edward C. Bell, Windsor, all of Great Britain, assignors to Thorn EMI plc, London, England

Filed Mar. 12, 1987, Ser. No. 25,049

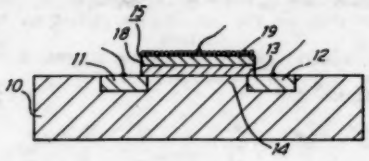
Claims priority, application United Kingdom, Mar. 12, 1986, 8606045

Int. Cl.[5] H01L *29/66, 29/96*

U.S. Cl. 357—25 **11 Claims**

1. A gas-sensitive field effect device includes a gas-sensitive

gate electrode comprising a catalytically active metal and a non-metallic material mixed with, or deposited at an exposed surface of, the metal wherein said non-metallic material enhances the catalytic activity of the metal and is selected from the group consisting of an oxide of a metal, an oxide of a



semiconductor, a metal zeolite and mixtures of more than one of said non-metallic materials the catalytically active metal and the non-metallic material being formed as an intimate mixture, the threshold voltage of the device thus varying dependent on the quantity of a gas incident on the gate electrode.

4,931,852

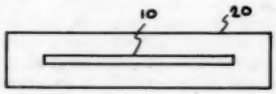
HIGH THERMAL CONDUCTIVITY/LOW ALPHA EMISSION MOLDING COMPOUND CONTAINING HIGH PURITY SEMICONDUCTOR FILLER AND INTEGRATED CIRCUIT PACKAGE

Candice H. Brown, San Jose, and Homi Fatemi, Cupertino, both of Calif., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Continuation-in-part of Ser. No. 874,251, Jun. 13, 1986. This application Apr. 12, 1988, Ser. No. 180,421

Int. Cl.[5] H01L *23/28, 23/30*

U.S. Cl. 357—72 **24 Claims**



1. An improved integrated circuit package comprising an integrated circuit die encapsulated by a molding compound having a semiconductor filler material therein selected from the class consisting of arsenic, boron, gallium, germanium, phosphorus, and silicon to enhance the thermal conductivity of said molding compound, said molding encapsulant having a thickness ranging from at least about 20 mils (about 509 microns) to about 300 mils (about 7634 microns).

4,931,853

IC CARD AND METHOD OF MANUFACTURING THE SAME

Masayuki Ohuchi, Tokyo; Hirosi Oodaira, Chigasaki, and Kenichi Yoshida, Tokyo, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

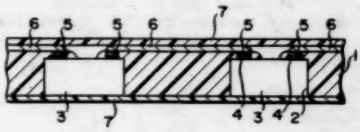
Continuation of Ser. No. 32,450, Mar. 31, 1987, abandoned. This application Sep. 6, 1989, Ser. No. 403,772

Claims priority, application Japan, May 20, 1986, 61-115585

Int. Cl.[5] H01L *23/02*

U.S. Cl. 357—74 **9 Claims**

1. An IC card, comprising an insulating core sheet formed of an insulating material and having a main surface, a bottom surface, and at least one through-hole, at least one semiconductor IC chip received within said hole, and having a main surface and a bottom surface, and at least one electrode, and at least one conductive layer pattern deposited on said core sheet, said conductive layer being connected to said electrode; and said semiconductor IC chip being thinner than said core sheet and including at least one conductive projection which is formed on said electrode and has top and side surfaces, said semiconductor IC chip being embedded in said core sheet by the insulating material so that the top surface of said conductive projection and the bottom surface of said IC chip are flush with the main surface and bottom surface of the core sheet,



respectively; said conductive layer pattern being deposited on the main surface of said core sheet; and the side surface of said conductive projection and only the peripheral portion of the main surface of said IC chip being covered with the material of said core sheet and said conductive layer pattern being connected with said conductive projection at said top surface.

4,931,854

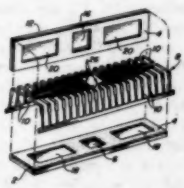
LOW CAPACITANCE INTEGRATED CIRCUIT PACKAGE

Hiro Yonemasu; Kiyohide Shirai, both of San Diego, Calif., and Ikunosuke Kawamura, Vancouver, Wash., assignors to Kyocera America, Inc., San Diego, Calif.

Filed Feb. 6, 1989, Ser. No. 307,830

Int. Cl.[5] H01L *23/02*

U.S. Cl. 357—74 **15 Claims**



1. A package for housing an integrated circuit chip comprising:

(a) a base substrate having a glass material selectively deposited thereon so as to form a plurality of discrete voids;

(b) a lead frame, having a plurality of leads, adjacent to the base substrate and partially embedded in the glass material; and

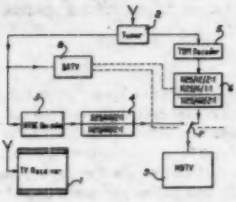
(c) a cap substrate having a glass material selectively deposited thereon so as to form at least one discrete void, whereby when the cap substrate is placed on the base substrate, the voids on the cap substrate and the voids on the base substrate form a plurality of glass-free cavities, the cavities being positioned such that a portion of the leads of the lead frame are disposed within at least one cavity, resulting in a reduction of the electrical capacitance of the leads with respect to one another.

4,931,855

METHOD FOR GENERATING AND TRANSMITTING HIGH-DEFINITION COLOR TELEVISION SIGNALS, COMPATIBLE WITH CURRENT STANDARDS AND PROCESS AND APPARATUS FOR RECEIVING SAID SIGNALS

Rolando Salvadorini, Turin, Italy, assignor to Rai Radiotelevisione Italiana, Turin, Italy

Filed Jul. 6, 1988, Ser. No. 215,644
Claims priority, application Italy, Feb. 18, 1988, 19452 A/88
Int. Cl.[5] H04N 9/32
U.S. Cl. 358—12 12 Claims



1. A method for producing a composite high-definition color TV signal compatible with a current standard of (a) a predetermined number of horizontal lines per screen, (b) a pre-established number of fields per second, and (c) a preselected ratio of screen length to screen height, starting from a primary high-definition color TV signal including luminance and color information for a number of horizontal lines substantially greater than the predetermined number of horizontal lines of the current standard, said primary high-definition color signal having a field frequency equal to the pre-established number of fields per second of the current standard, said primary high-definition color TV signal having a ratio of screen length to screen height which is larger than the preselected ratio of screen length to screen height of the current standard, said primary high-definition color TV signal contains luminance and color information for a TV picture image having at least one area of uniform movement, said method comprising the steps of:

converting said primary high-definition color TV signal into a first secondary color TV signal having the predetermined number of horizontal lines per screen, the pre-established number of fields per second, and the preselected ratio of screen length to screen height of the current standard, said step of converting said primary high-definition color TV signal into said first secondary color TV signal including the step of inserting a plurality of informationless lines into said first secondary color TV signal to produce, in a picture on a current-standard TV receiving said first secondary color TV signal, a black band, whereby said picture has the screen length to screen height ratio of said primary high-definition color TV signal;

converting said primary high-definition color TV signal into a second secondary color TV signal corresponding to the same number of horizontal lines as said primary high-definition color TV signal and having a field frequency which is a submultiple of the pre-established number of fields per second of the current standard;

transmitting said first secondary color Tv signal and said second secondary color TV signal as the composite high-definition color TV signal on two separate TV channels;

generating an auxiliary digital signal encoding motion vectors specifying said area of uniform movement; and

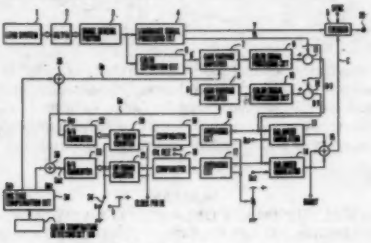
inserting said auxiliary digital signal in signal regions of said first secondary color TV signal corresponding to said black band.

4,931,856

IMAGE SENSING APPARATUS

Teruo Hieda; Masao Suzuki, and Hitoshi Narita, all of Kanagawa, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 175,670, Mar. 21, 1988, abandoned, which is a continuation of Ser. No. 80,253, Jul. 27, 1987, abandoned, which is a continuation of Ser. No. 686,712, Dec. 27, 1984, abandoned. This application Feb. 16, 1989, Ser. No. 311,434
Claims priority, application Japan, Dec. 28, 1983, 58-245909
Int. Cl.[5] H04N 9/07, 9/73
U.S. Cl. 358—29 31 Claims



1. A color image sensing apparatus comprising:

(a) image sensing means for converting an optical image into an electrical picture signal having various color signal components;

(b) distinction means for distinguishing color balance conditions of said various color signal components;

(c) white balance control means responsive to an output of said distinction means for controlling white balance of said various color signal components;

(d) light detection means other than said image sensing means for detecting a color temperature condition of an object image to be picked up and for generating an output signal corresponding to said color temperature; and

(e) compensation means for generating a compensation output signal in response to the output of said light detection means for compensating said white balance of said various color signal components controlled by said white balance control means.

4,931,857

VOLTAGE CONTROLLED COMB FILTER

Yositeru Kosaka, Zushi, and Kunio Yamada, Tokyo, both of Japan, assignors to Victor Company of Japan, Ltd., Yokohama, Japan

Filed Jun. 23, 1988, Ser. No. 212,059
Claims priority, application Japan, Jun. 23, 1987, 62-156256
Int. Cl.[5] H04N 9/79, 9/78
U.S. Cl. 358—31 4 Claims

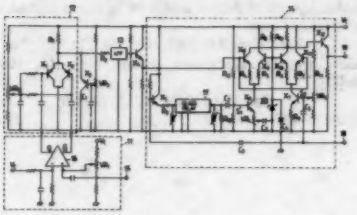
1. A comb filter, comprising:

(a) delay means responsive to an input signal for delaying said input signal for a predetermined period of time; and

(b) variable mixing means responsive to said input signal and to an output signal from said delay means for combining said input signal with said output signal in a proportion variable in accordance with a control signal,

wherein said mixing means comprises a first voltage controlled amplifier for amplifying said input signal with a first gain variable in accordance with said control signal and a second voltage controlled amplifier for amplifying said output signal with a second gain variable in accordance with said control signal, the first and second vari-

able gains having a complementary relation to each other, and an adding circuit for adding an output signal from said



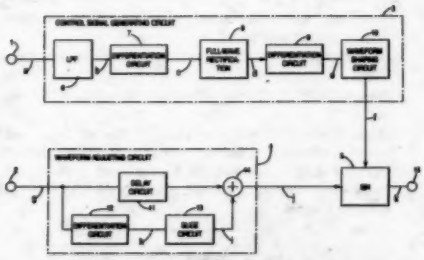
first voltage controlled amplifier to an output signal from said second voltage controlled amplifier.

4,931,858

WAVEFORM IMPROVING APPARATUS

Masahiro Honjo, Neyagawa, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jan. 19, 1989, Ser. No. 298,980
Int. Cl.[5] H04N 9/64
U.S. Cl. 358—37 **15 Claims**



2. A waveform improving apparatus comprising:

first differentiation means for differentiating a first signal;

adding means for adding an output signal of the first differentiation means and the first signal to obtain a waveform-adjusted first signal;

second differentiation means for differentiating a second signal which has a correlation to the first signal;

full-wave rectification means for full-wave rectifying an output signal of the second differentiation means;

third differentiation means for differentiating an output signal of the full-wave rectification means to obtain a control pulse; and

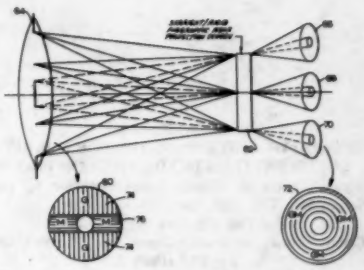
sampling and holding means responsive to the control pulse for sampling a level of the waveform-adjusted first signal at the leading edge of the control pulse and holding a sampled level during a duration of the control pulse to obtain a waveform improved first signal.

4,931,859

SCHLIEREN COLOR TELEVISION IMAGE APERTURING DEVICE

Homer E. Dillard, Bridgeton; John A. VanHoogstrate, St. Peters, both of Mo., and Ronald J. Muffler, Sandy, Utah, assignors to McDonnell Douglas Corporation, St. Louis, Mo.

Continuation of Ser. No. 21,420, Mar. 4, 1987. This application Jan. 17, 1989, Ser. No. 297,423
The portion of the term of this patent subsequent to Mar. 21, 2006, has been disclaimed.
Int. Cl.[5] H04N 9/31
U.S. Cl. 358—60 **20 Claims**



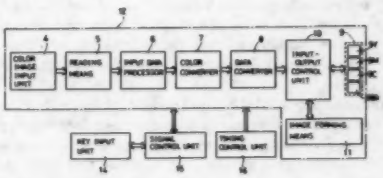
1. In a television projection system having means to produce an image comprised of a plurality of spatially separated, converging rays of component colors, means to focus said rays along an optical axis at a focal point, said image being thereby unsuited to aperture control, the improvement comprising means to translate said image into a like image comprised of a plurality of pixels, said pixels being comprised of a plurality of spatially combined diverging rays of combined colors, said like image being thereby suitable for aperture control.

4,931,860

IMAGE DATA COMPOSING SYSTEM AND PROCESS FOR STORING BOTH MONOCHROME AND POLYCHROME IMAGE DATA

Masao Narumiya, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Jul. 18, 1988, Ser. No. 219,775
Claims priority, application Japan, Jul. 20, 1987, 62-181824
Int. Cl.[5] H04N 1/46
U.S. Cl. 358—75 **28 Claims**



25. A method of creating a combined image of a polychrome original image and a monochrome original image, comprising the steps of:

(a) inputting polychromatic image data from said polychrome original image;

(b) separating said polychromatic image data into data corresponding to separate primary colors;

(c) storing said data corresponding to each of said primary colors, in a separate memory means;

(d) selecting a color, corresponding to at least one of said

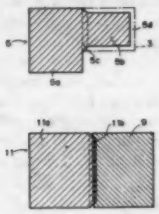
primary colors, to represent monochromatic data from said monochrome original image;
(e) inputting said monochromatic image data;
(f) designating at least one of said separate memory means, corresponding to said selected color, to store said monochromatic image data;
(g) storing said monochromatic data in said designated memory means in combination with said polychromatic image data previously separated and stored;
(h) outputting data stored in said separate memory means to form said combined image.

4,931,861

METHOD OF AND APPARATUS FOR CORRECTING COLOR PATTERN IN MULTICOLOR PROCESS

Hisayuki Taniguchi, Kyoto, Japan, assignor to Dainippon Screen Mfg. Co., Ltd., Japan

Filed Dec. 23, 1988, Ser. No. 289,183
Claims priority, application Japan, Dec. 25, 1987, 62-326684
Int. Cl.[5] H04N *1/46*
U.S. Cl. 358—75 27 Claims



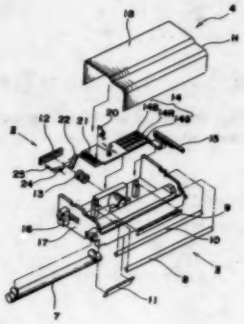
1. A method of correcting a set of color patterns for an overprinting process for producing a multicolor print image, said method comprising the step of:
(a) specifying a first color pattern having a first color to be subjected to shape correction and a second color pattern having a second color not requiring shape correction,
(b) generating first and second digitized color pattern data expressing respective shapes and colors of said first and second color patterns for each pixel of said color patterns and obtaining from said digitized color pattern data first and second binary image data expressing said respective shapes of said first and second color patterns for each pixel,
(c) obtaining a third binary image data on the basis of said first and second binary image data, said third binary image data expressing an overlapping area at which said second color pattern is overlapping with said first color pattern,
(d) executing logical processing on said third binary image data to obtain a fourth binary image data expressing a modified overlapping area which is reduced by a prescribed width from said overlapping area,
(e) modifying said first digitized color pattern data on the basis of said fourth binary image data to obtain a modified first color pattern data expressing said modified overlapping area with said first color, and
(f) replacing said first digitized color pattern data with said modified first color pattern data to obtain a set of modified color pattern data which includes said modified first color pattern data in place of said first color pattern data.

4,931,862

FILTER CHANGE-OVER MECHANISM FOR USE IN COLOR IMAGE READING APPARATUS

Motokazu Nakao, Sakurai; Tomotarou Tojo, Nara, and Kenji Tanaka, Uji, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Nov. 15, 1988, Ser. No. 271,326
Claims priority, application Japan, Nov. 19, 1987, 62-176746[U]
Int. Cl.[5] H04N *1/028, 1/46*
U.S. Cl. 358—75 11 Claims



1. A filter change-over system in a color image reading apparatus, for use during scanning of an original document by said color image reading apparatus, said filter change-over system providing color separation of light from a light source reflected from said original document during said scanning, said system comprising:
a contact member; and
filter change-over means for sequentially subjecting each of a plurality of filters to said reflected light to provide said color separation, said filter change-over means including
a filter panel with said plurality of filters disposed thereon at one end of said panel,
an arm member pivotably connected to said filter panel, and
a shaft member extending outwardly from said arm member,
said shaft member, upon sequential contact with said contact member, pivoting said arm member, thereby laterally displacing said filter panel and thus sequentially subjecting each of said plurality of filters to said reflected light.

4,931,863

ELECTRONIC PHOTOGRAPHIC PRINTER/ENLARGER

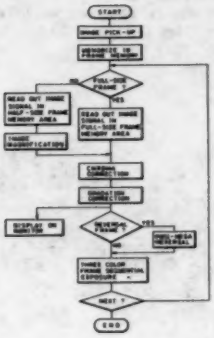
Kanji Tokuda, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Aug. 1, 1988, Ser. No. 226,908
Claims priority, application Japan, Jul. 31, 1987, 62-191683
Int. Cl.[5] H04N *1/23, 1/393, 1/46*
U.S. Cl. 358—78 8 Claims

1. A photographic printer for making prints from pictures of different sizes of a photographic film, said photographic printer comprising:
means for taking an image of each picture of a roll of photographic film to provide image signals;
memory means for storing said image signals in different memory areas according to said different picture sizes;
means for processing said image signals for said half-size pictures read out of said memory means so as to display images magnified to be as large as images of said full-size pictures, said means for processing including means for

interpolating said image signals for said half-size pictures so as to produce said magnified images;

read out means for reading out said image signals for each picture from said memory means;



display means for displaying said image signals as a negative image thereon; and

printing means for printing said negative image displayed on said display means on a photographic material.

4,931,864

IMAGE FORMING APPARATUS WHICH PERFORMS GAMMA CORRECTION ON THE BASIS OF A CUMULATIVE FREQUENCY DISTRIBUTION PRODUCED FROM A HISTOGRAM OF IMAGE DATA REPRESENTING A SELECTED AREA OF AN IMAGE

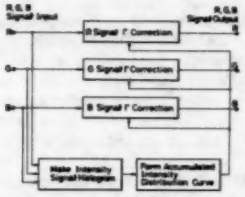
Hideaki Kawamura, Tokyo; Nobuaki Sakuraba, Yokohama, and Takashi Sasaki, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 348,120, May 3, 1989, abandoned, which is a continuation of Ser. No. 96,253, Sep. 8, 1987, abandoned, which is a continuation of Ser. No. 682,347, Dec. 17, 1984, abandoned. This application Sep. 27, 1989, Ser. No. 412,608

Claims priority, application Japan, Dec. 27, 1983, 58-245969

Int. Cl.[5] **G03F** *3/08*; **H04N** *1/38, 1/40, 1/46*

U.S. Cl. 358—80 **34 Claims**



9. An image forming apparatus comprising:

memory means for storing image data corresponding to a given image;

designating means for designating a partial area of the given image;

reading means for reading out the image data corresponding to the partial area from said memory means;

determining means for determining a conversion characteristic of the image data read out by said reading means;

converting means for converting the image data corresponding to the partial area in accordance with the conversion characteristic determined by said determining means; and

image forming means for forming an image corresponding to the partial area based on an output of said converting means.

18. An image forming apparatus comprising:

reproducing means for reproducing an image;

conversion means for density conversion of an image signal representing the image;

regulating means for regulating the density conversion characteristic of said conversion means; and

designating means for designating a particular area of the image;

wherein said reproducing means is adapted to form an image of at least the particular area from the image signal, and wherein said regulating means regulates the density conversion characteristic of the conversion means in dependence on a portion of the image signal representing the particular area designated by said designating means.

4,931,865

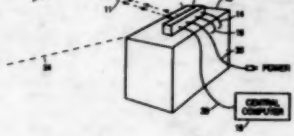
APPARATUS AND METHODS FOR MONITORING TELEVISION VIEWERS

Sebastiano Scarampi, 25550 Moody Rd., Los Altos Hills, Calif. 94022

Filed Aug. 24, 1988, Ser. No. 235,927

Int. Cl.[5] **H04H** *9/00*; **G06K** *9/00*

U.S. Cl. 358—84 **20 Claims**



1. Apparatus for monitoring the television viewing acts of an individual comprising:

means for transmitting a signal from the vicinity of a television into the viewing area of the television;

means for detecting reflections of said signal from the eyes of an individual in the viewing area of the television; and

means for determining whether the reflected signal satisfies predetermined criteria indicating that the individual is viewing the television.

4,931,866

DISTRIBUTED COAXIAL LIGHT SOURCE PRODUCING CONSTANT TARGET LUMINANCE

Arthur M. Charlesworth, Ottawa, and Harold F. L. Pinkney, Nepean, both of Canada, assignors to Canadian Patents and Development Limited, Ottawa, Canada

Filed Mar. 8, 1989, Ser. No. 320,488

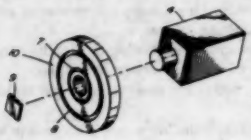
Claims priority, application Canada, Mar. 18, 1988, 561918

Int. Cl.[5] **H04N** *7/18*

U.S. Cl. 358—93 **18 Claims**

1. A luminous source for illuminating a target, comprising at least several luminous points symmetrically distributed within each of a pair of concentric rings for mounting coaxially with a camera axis close to the plane of its lens diaphragm, the mean radius of an inner one of the rings being smaller than the means radius of the outer one of the rings by a factor of about 1.6, the

luminous intensity of the inner ring being lower than that of the outer ring by a factor of about 2.56, the radial width of each of



the rings being no greater than approximately 0.2 times the mean radius of the corresponding ring.

4,931,867

ELECTRONIC ENDOSCOPE APPARATUS HAVING AN ISOLATION CIRCUIT FOR ISOLATING A PATIENT CIRCUIT FROM A SECONDARY CIRCUIT

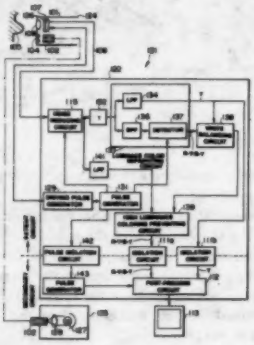
Kenichi Kikuchi, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Feb. 28, 1989, Ser. No. 316,906

Claims priority, application Japan, Mar. 1, 1988, 63-48364; Jun. 13, 1988, 63-146644; Jan. 10, 1989, 1-3350

Int. Cl.[5] A61B 1/04

U.S. Cl. 358—98 **17 Claims**



1. An electronic endoscope apparatus having an isolation circuit comprising:

an endoscope provided with an imaging means converting the photoinformation of an object into an output electric signal;

a video signal processing means processing the output electric signal of said imaging means into a video signal;

an isolating means for separating and for isolating said video signal processing means into a) a patient circuit including said imaging means and b) a secondary circuit which is a circuit not included in said patent circuit; and

a signal producing means for making either one of said patient circuit and said secondary circuit a transmitted side circuit and the other a transmitting side circuit and for producing a signal required by said transmitted side circuit based upon a signal forming an image transmitted to the transmitted side circuit through said isolating means from the transmitting side circuit.

4,931,868

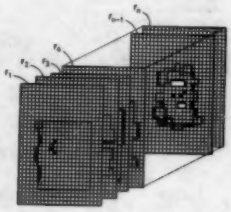
METHOD AND APPARATUS FOR DETECTING INNOVATIONS IN A SCENE

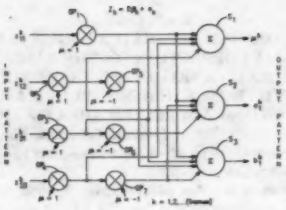
Ivan Kadar, Flushing, N.Y., assignor to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed May 31, 1988, Ser. No. 200,605

Int. Cl.[5] H04N 7/18

U.S. Cl. 358—105 **19 Claims**





1. A method for detecting innovations in a scene comprising an array of pixels, the method comprising the steps of:

generating at each of a multitude of times, a set of input signals representing the amount of light incident on a group of adjacent pixels, each set of input signals forming an n by one vector, where n equals the number of signals in the set, the sets of input signals being represented by Z_k, where k = 1, 2, 3, . . . , m, and m equals the number of said input sets;

conducting the sets of input signals to a processing network;

the processing network transforming each set of input signals to a respective one set of output signals, the sets of output signals being represented by β_k, wherein Z_k and Z_k satisfy the relation $Z_k = D\beta_k + e_k$, where D is an at least four by an at least three matrix, and e_k represents noise in the set of signals Z_k;

conducting the sets of output signals to a detection means; and

the detection means,

(i) sensing the magnitude of at least one signal of each set of output signals, and

(ii) generating a detection signal to indicate a change in the scene when said one signal rises above a respective one preset level.

4,931,869

METHOD AND CIRCUIT ARRANGEMENT FOR REDUCING THE DATA RATE OF DIGITIZED IMAGES

Hamed Amor, Hildesheim, and Hans-Dieter Lilke, Aachen, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

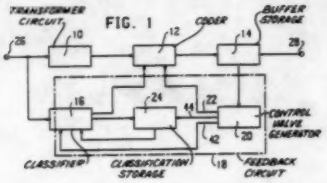
PCT No. PCT/DE87/00509, § 371 Date Apr. 21, 1989, § 102(e) Date Apr. 21, 1989, PCT Pub. No. WO88/04508, PCT Pub. Date Jun. 16, 1988

PCT Filed Nov. 24, 1987, Ser. No. 347,773

Claims priority, application Fed. Rep. of Germany, Dec. 12, 1986, 3642492

Int. Cl.[5] A04N 7/133

U.S. Cl. 358—133 12 Claims



1. Method of reducing the data rate of digitized images, comprising the steps of transforming the incoming image data into blocks, subsequently coding the image data block by block, and storing the same temporarily before they are output, each image data block being assigned on the basis of its own image definition statistics to a classification factor selected from a collection of predetermined classes corresponding to different local resolutions and the consecutive image data blocks being coded according to the classes assigned to them; deriving from the extent of the temporary stored data control variable; and changing the data extent of image data blocks by changing the assignment of the classes to the respective image data blocks in dependency on the control variable.

4,931,870

RAPID ACCESS TELETEXT DECODER ARRANGEMENT

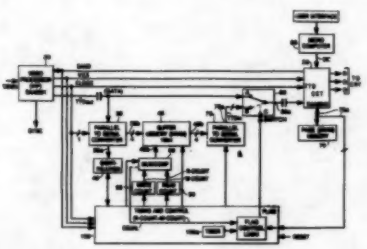
Willem den Hollander, Schlieren, Switzerland, assignor to RCA Licensing Corporation, Princeton, N.J.

Filed Feb. 28, 1989, Ser. No. 316,830

Claims priority, application United Kingdom, Mar. 18, 1988, 8806479; May 23, 1988, 8812136

Int. Cl.[5] H04N 7/04, 7/087

U.S. Cl. 358—142 33 Claims



31. A television apparatus responsive to an incoming television signal containing video lines that carry text data, defining corresponding data lines, for generating an output signal that is capable of providing picture information to a display device, comprising:

first means for generating a first control signal in order to select one of said data lines to be used in conjunction with the generation of said output signal;

second means responsive to said television signal for generating a clock signal that is indicative of timings of individual bits of a data sequence of a clock run-in portion of a data line;

a source of said television signal;

a first-in, first-out background memory having a data input that is coupled to said source;

third means coupled to said background memory and responsive to said television signal and to said clock signal for identifying in a given video line, said data sequence of said clock run-in portion of said data line and for storing in said background memory such video lines that are identified as data lines but only when individual bits of said data sequence of said clock run-in portion are correct, said first means storing said data lines such that prior to the generation of said first control signal, said background memory already contains a substantial number of stored data lines of said television signal;

fourth means responsive to said first control signal and coupled to said background memory for controlling during a given interval that follows the generation of said first control signal, read-out from said background memory of a plurality of stored data lines of said television signal, such that the duration of said given interval is substantially shorter than that of a corresponding interval between the occurrence of an initial data line of said plurality of data lines and the occurrence of a final data line thereof, so as to reduce access time to said plurality of data lines, said fourth means controlling read-out of said plurality of data lines in a first-in, first-out manner for generating during said given interval, a data signal that contains the data of said plurality of data lines; and

a data processor responsive to said data signal for selecting said one data line to generate in accordance therewith said output signal.

4,931,871

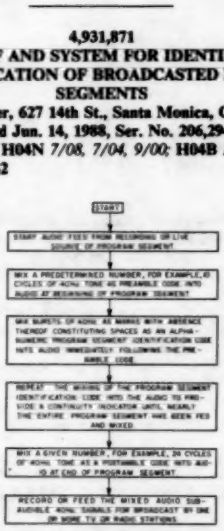
METHOD OF AND SYSTEM FOR IDENTIFICATION AND VERIFICATION OF BROADCASTED PROGRAM SEGMENTS

Robert A. Kramer, 627 14th St., Santa Monica, Calif. 90402

Filed Jun. 14, 1988, Ser. No. 206,294

Int. Cl.[5] H04N 7/08, 7/04, 9/00; H04B 17/00

U.S. Cl. 358—142 33 Claims


START
START AUDIO FEED FROM RECORDING OR LIVE SOURCE OF PROGRAM SEGMENT
MIX A PREDETERMINED NUMBER, FOR EXAMPLE, 10 CYCLES OF 40Hz TONE AS PREAMBLE CODE INTO AUDIO AT BEGINNING OF PROGRAM SEGMENT
MIX SUBSTS. OF AUDIO AS MARKS WITH ABSENCE THEREOF CONSTITUTING SPACES AS AN ALPHA-NUMERIC PROGRAM SEGMENT IDENTIFICATION CODE INTO AUDIO IMMEDIATELY FOLLOWING THE PREAMBLE CODE
REPEAT THE MIXING OF THE PROGRAM SEGMENT IDENTIFICATION CODE INTO THE AUDIO TO PROVIDE A CONTINUITY INDICATOR UNTIL NEARLY THE ENTIRE PROGRAM SEGMENT HAS BEEN FED AND MIXED
MIX A GIVEN NUMBER, FOR EXAMPLE, 20 CYCLES OF 40Hz TONE AS A POSTAMBLE CODE INTO AUDIO AT END OF PROGRAM SEGMENT
RECORD OR FEED THE MIXED AUDIO SUBAUDIBLE 40Hz SIGNALS FOR BROADCAST BY ONE OR MORE TV OR RADIO STATIONS

1. A system for identification and verification of broadcasted program segments, the system comprising:

a plurality of broadcasting stations for broadcasting signals which include program segments having a subaudible preamble code, respective subaudible program segment identification codes, following each preamble code occur-

rence and a subaudible postamble code following each program segment identification code occurrence;

at least one monitoring station for receiving the broadcasted signals, said monitoring station including (a) means for generating date-indicating and time-indicating signals, (b) respective channels responsive to the broadcasted signal from each respective broadcasting station for recovering each received preamble code, each received respective program segment identification code and each received postamble code and (c) means for providing respective broadcast station-identification signals;

means at the monitoring station for storing data signal representations of each recovered preamble code, recovered respective program segment identification codes and recovered postamble code, the date-indicating and time-indicating signals, and the station-identifying signals for each channel; and

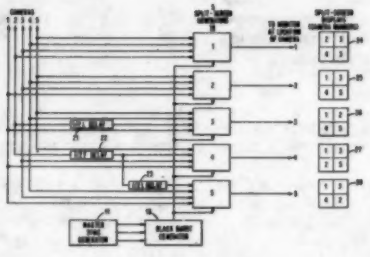
means at the monitoring station for sending the stored data signal representations to a central station, the central station being provided with means for receiving data from a plurality of monitoring station to compile and/or to reconcile same.

4,931,872

METHODS OF AND APPARATUS FOR THE GENERATION OF SPLIT-SCREEN VIDEO DISPLAYS

James C. Stoddard, Wayland, and Ernest P. Tweedy, Lexington, both of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Filed Nov. 24, 1986, Ser. No. 934,521
Int. Cl.[5] H04N 5/262
U.S. Cl. 358—183 **18 Claims**



1. A method of generating a split-screen video display for conferees located at n different sites, wherein n is an integer greater than two, comprising the steps of

focusing video cameras centrally onto respective conferees at respective ones of said different sites, and

providing each of said conferees with a different respective monitor display of the remaining conferees at different locations on said monitor, said provision of the different locations of said remaining conferees being determined electronically, rather than by panning or tilting of said cameras.

4,931,873

PHOTOELECTRIC LINEAR IMAGE SENSOR HAVING MULTILAYER INSULATING LAYER TO REDUCE DEFECTS

Masaharu Nishiura, Matsumoto, Japan, assignor to Fuji Electric Co., Ltd., Kawasaki

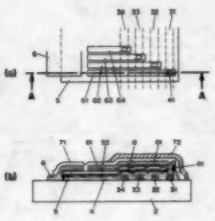
Filed May 13, 1988, Ser. No. 194,423
Claims priority, application Japan, May 18, 1987, 62-120886; Nov. 7, 1987, 62-281881
Int. Cl.[5] H04N 3/14
U.S. Cl. 358—213.11 **8 Claims**

1. A linear image sensor comprising a substrate having disposed thereon a common electrode and a linear array of a plurality of detecting elements, each detecting element comprising

(a) a photodetecting resistor in electrical contact with said common electrode;

(b) a matrix electrode adjacent to the photodetecting resistor, said matrix electrode being adapted for connection to an external circuit;

(c) an insulating layer disposed over a portion of said matrix electrode and having a window formed therein coincident with said matrix electrode; and



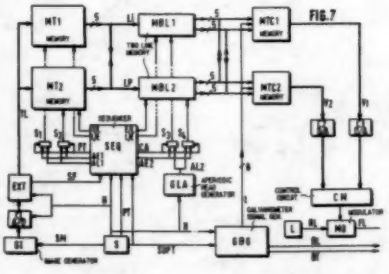
(d) a leader electrode disposed over said insulating layer, said leader electrode making electrical contact with said matrix electrode through the window in the insulating layer and further making electrical contact with the photodetecting resistor, but not making direct electrical contact with said common electrode, wherein the insulating film comprises a plurality of separately formed layers, one over another.

4,931,874

DIGITAL SYSTEM FOR GENERATING LASER-MODULATION MULTI-CHANNEL CIRCUIT CONTROL SIGNALS FOR AN OSCILLATING MIRROR PROJECTOR OF SCANNED IMAGES

Jean Grillon, Eragny sur Oise, and Christian Moreau, Montigny le Bretonneux, both of France, assignors to Thomson-CSF, Paris, France

Filed Mar. 18, 1988, Ser. No. 169,953
Claims priority, application France, Mar. 20, 1987, 87 03918
Int. Cl.[5] H04N 5/74
U.S. Cl. 358—231 **5 Claims**



1. A digital system for the generation of control signals for laser modulation multi-channel circuits for scanned image projectors using oscillating mirrors mounted on galvanometers, said system including one or more laser sources and a plurality of laser modulation circuits controlled by video signals from an image to be projected; and a plurality of oscillating mirrors mounted on pencil-shaped galvanometers capable of deflecting a laser beam from said laser sources along two

orthogonal axis so as to provide a scanned image wherein one of said galvanometers is a line galvanometer; said digital system producing a digitized video signal and further comprising:

at least one compensation circuit which modulates the duration of the pixels of said image and which modulates the position of said pixels in the period of a line of said digitized video image wherein said compensation circuit includes a means for modulation of the duration of the pixels and of their position which is inversely proportional tot he instantaneous speed of said galvanometer and said compensation means further includes an adjustment for adjusting the values of the laser fluxes in proportion to said instantaneous speed of said galvanometer:

whereby said compensation circuit provides for adjustment and correction of line galvanometer motion non-linearity.

4,931,875

IMAGE RECORDING SYSTEM CAPABLE OF FORMING IMAGE AREA BY AREA

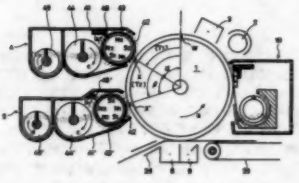
Yukio Tadauchi, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Apr. 12, 1989, Ser. No. 337,097

Claims priority, application Japan, Apr. 14, 1988, 63-93229

Int. Cl.[5] H04N *1/29, 1/46;* **G01D** *15/06;* **G03G** *15/01*

U.S. Cl. 358—300 **7 Claims**



1. An image recording system comprising a host control unit for generating image data and a printer apparatus for forming an image on a sheet of paper in accordance with the image data generated from said host control unit, wherein

said printer apparatus having a function of dividing the image into at least two image areas with respect to a boundary and of forming each of said image areas in different colors,

said host control unit adapted to apply to said printer apparatus a boundary signal indicative of the boundary of at least two image areas which are to be formed in different colors,

said printer apparatus comprising

designating means for designating one of said image areas as an image to be formed, and

prohibiting means for prohibiting formation of the image area other than the image area designated by said designating means.

4,931,876

ELECTROPHOTOGRAPHIC RECORDING APPARATUS FOR A FACSIMILE DEVICE

Hiroshi Hashizume, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Filed Sep. 28, 1988, Ser. No. 250,464

Claims priority, application Japan, Sep. 29, 1987, 62-147605[U]

Int. Cl.[5] H04N *1/29;* **G01D** *15/14*

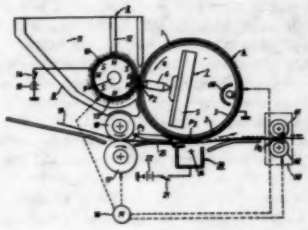
U.S. Cl. 358—300 **20 Claims**

1. An electrophotographic recording apparatus comprising:

a photosensitive means including a transparent conductive layer and a photosemiconductor layer layered formed on a transparent support;

exposure means having a plurality of light emitting elements disposed in a row and positioned on the transparent support side of the photosensitive means for converting input image data for one line to an optical signal, irradiating the transparent support of the photosensitive means with the converted light signal to form on the photosemiconductor an electrostatic latent image corresponding to the image data;

development means disposed on the opposite side of the photosensitive means from the exposure means for depositing toner having a polarity opposite to that of the electrostatic latent image on the latent image in the photosemiconductor layer by application of a predetermined bias voltage to a developing electrode;



transfer means for transferring the toner deposited on the photosemiconductor layer to a recording medium;

means for conveying the recording medium between the transfer means and the photosemiconductor layer;

means for rotating the photosensitive means;

fixing means for fixing the toner on the recording medium to the recording medium comprising two rollers disposed facing each other with the recording medium therebetweens for pressing the recording medium;

control means for operating the exposure means, the development means, the conveying means, the fixing means and the rotating means synchronously with the receipt of said received image data.

4,931,877

METHOD AND APPARATUS FOR PRODUCING A TEST SIGNAL FOR USE IN A VIDEO RECORDER

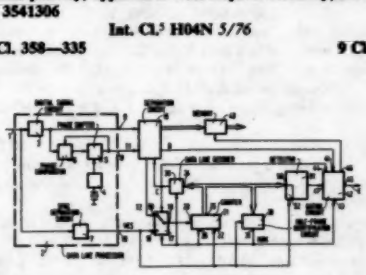
Arne W. Gebhardt, Hamburg; Horst G. Müller, Kummerfeld, and Günther H. Stücker, Kaltenkirchen, all of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 934,050, Nov. 24, 1986, abandoned. This application Oct. 17, 1988, Ser. No. 259,456

Claims priority, application Fed. Rep. of Germany, Nov. 22, 1985, 3541306

Int. Cl.[5] H04N *5/76*

U.S. Cl. 358—335 **9 Claims**



1. A circuit arrangement for controlling the operation of a video recorder from a television signal received thereby, said television signal comprising a digital signal periodically providing program data, a sync signal comprised of a plurality of sync pulses and a first clock signal, said circuit comprising:

(a) means for deriving from said television signal said digital signal, said sync pulses and said first clock signal;

(b) means coupled to said deriving means, for generating a second clock signal synchronized with said first clock signal;

(c) a counter having a first input and a second input, said second input coupled to said deriving means so as to receive therefrom said sync pulses;

(d) a switch having a switch output coupled to said first input of said counter, a first switch input coupled to said generating means so as to receive therefrom said second clock signal and a second switch input coupled to said deriving means so as to receive therefrom said sync pulses, said switch having a first position in which said first switch input is connected to said switch output and a second position in which said second switch input is connected to said switch output, said counter measuring the intervals between said sync pulses when said switch means is in said first position, and counting said sync pulses when said switch means is in said second position;

(e) first monitoring means coupled to said counter and said switch, for monitoring the output of said counter when said switch is in said first position so as to detect the beginning of a first field and for generating in response thereto an identification signal, said identification signal causing said switch to assume said second position;

(f) second monitoring means coupled to said counter and said switch, for monitoring the output of said counter when said switch is in said second position so as to detect the presence of said digital signal and for generating a release signal in response thereto, said release signal causing said switch to assume said first position;

(g) means coupled to said second monitoring means, for separating said program data from said digital signal for the duration of said release signal and for generating a control signal in response thereto;

(h) means coupled to said counter, for providing a detection signal when said switch is in said first position and a pulse occurs in a particular interval between two successive sync pulses or no pulse occurs after a particular interval longer than the line duration of said television signal; and

(i) means coupled to said separating means, said first monitoring means and said detection signal providing means, for generating a test signal which assumes a first state in response to said identification signal or to said detection signal, and which assumes a second state in response to said control signal.

4,931,878

RECORDING APPARATUS WHICH IS CAPABLE OF RECORDING TWO KINDS OF SIGNALS BY OPERATION OF A SINGLE MEMBER

Masahiro Takei, and Kenichi Shinbori, both of Yokohama, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 828,255, Feb. 11, 1986, abandoned.
This application Apr. 29, 1988, Ser. No. 188,748
Claims priority, application Japan, Feb. 12, 1985, 60-023399
Int. Cl.[5] H04N *5/782*
U.S. Cl. 358—335 **10 Claims**

1. A recording apparatus which is capable of storing a video signal and an audio signal together on a recording medium, comprising:

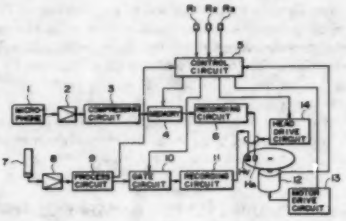
(a) a memory for storing an audio signal generated during a predetermined time;

(b) recording means for recording on said recording medium the audio signal stored in said memory and the video signal; and

(c) manually operating means for causing said recording means to record the audio signal stored in said memory and the video signal, said manually operating means including;

(A) a first triggering switch, having a first state and a second state, for causing said recording means to record the video signal on said recording medium in said second state;

(B) a second triggering switch, having a first state and a second state, for causing an audio signal to be stored in said memory in said second state; and



(C) a third trigger switch, having a first state and a second state, for updating said audio signal stored in said memory by a new audio signal before recording the audio signal on said recording medium; and

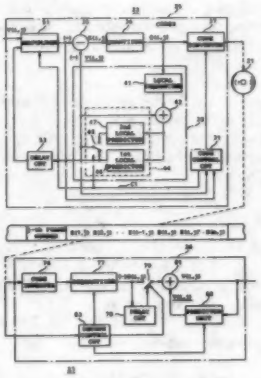
said manually operating means comprising a single operating member which operates the states of said three switches.

4,931,879

IMAGE PROCESSING SYSTEM FOR RECORDING OR REPRODUCING AN IMAGE SIGNAL SEQUENCE WHICH HAS BEEN ENCODED BY EMPLOYING TWO PREDICTIVE CODING METHODS AND COMBINING THE RESULTS OF THOSE METHODS

Toshio Koga; Junichi Ohki; Mutsumi Ohta, all of Tokyo, and Hideto Kunihiro, Osaka, all of Japan, assignors to NEC Corp. and NEC Home Electronics Ltd., both of, Japan

Filed May 2, 1988, Ser. No. 189,249
Claims priority, application Japan, Apr. 30, 1987, 62-108350; Apr. 30, 1987, 62-108352; Jun. 12, 1987, 62-147433; Jun. 12, 1987, 62-147434; Jun. 12, 1987, 62-147435; Jun. 12, 1987, 62-147436
Int. Cl.[5] H04N *5/76*
U.S. Cl. 358—335 **11 Claims**



1. An image recording system which is successively supplied with image signals which are to be subjected to redundancy reduction coding, and which records, on a recording medium, recorded signals obtained by processing said image signals, said image signals being representative of moving images and clustered into a plurality of image units each of which is com-

posed of the image signals, wherein the improvement comprises:

code control signal producing means for producing a code control signal which, in order to carry out said redundancy reduction coding, indicates a selected one of a first predictive coding method and a second predictive coding method which are different from each other, said first predictive coding method being carried out by performing a first correlation between adjacent ones of said image units and said second predictive coding method being carried out by performing a second correlation of the image signals within each image unit;

coding means responsive to said code control signal and said image signals for selectively coding said image signals to generate coded signals by carrying out said selected one of the first predictive coding method and said second predictive coding method in response to said code control signal, said coded signals including first coded signals resulting from said first predictive coding method and second coded signals which result from said second predictive coding method and which are interlaced with said first coded signals; and

means for recording said first and said second coded signals on said recording medium as said recording signals.

4,931,880

COPYING APPARATUS

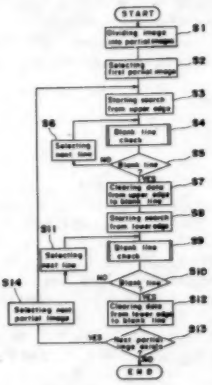
Yuji Takada, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Apr. 20, 1989, Ser. No. 340,770

Claims priority, application Japan, Apr. 25, 1988, 63-101949

Int. Cl.[5] H04N *1/387*

U.S. Cl. 358—453 **8 Claims**



1. A copying apparatus comprising:

image reading means for reading an image of a portion of a document and generating dot images corresponding to said image having been read;

memory means for storing dot images obtained by said image reading means;

image division means for dividing said stored dot images into partial images in a direction of print;

image extraction means for extracting only a central portion to be printed out with respect to each of said divided partial images by detecting a pair of blank lines between which said central portion is defined; and

print means for printing out said central portions of said divided partial images.

4,931,881

METHOD OF REDUCING DIGITAL IMAGES

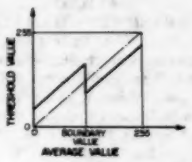
Nobuhiko Matsui, and Kikuo Mita, both of Tokyo, Japan, assignors to Eastman Kodak Company, Rochester, N.Y.

Filed May 1, 1989, Ser. No. 346,634

Claims priority, application Japan, Jan. 25, 1989, 1-016014

Int. Cl.[5] H04N *1/40*

U.S. Cl. 358—466 **4 Claims**



1. A method of reducing a digital image having digital pixels with discrete values corresponding to multiple density values into a binary image having binary pixels with values corresponding to black and white, respectively, comprising the steps of:

a. calculating the average value of density values of the digital pixels around each given digital pixel to be reduced;

b. comparing such average pixel value with a selected boundary value;

c. selecting a threshold value in accordance with an algorithm which is based upon whether the average value is different than the boundary value; and

d. comparing the selected threshold value with the given digital pixel value and producing a binary signal.

4,931,882

IMAGE RECORDING APPARATUS WITH EVENING OF THE RECORDING MEDIUM

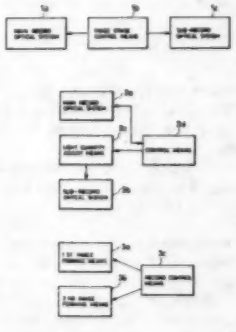
Hiroaki Takeda, Kawasaki; Masato Ishida, Yokohama; Eiichi Abe, Yokohama, and Isamu Sato, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 4, 1988, Ser. No. 177,501

Claims priority, application Japan, Apr. 2, 1987, 62-79572; Apr. 2, 1987, 62-79576; Apr. 2, 1987, 62-79577

Int. Cl.[5] H04N *1/04*

U.S. Cl. 358—474 **17 Claims**



1. An image recording apparatus comprising:

first recording means for scanning an original image and recording an image on a recording medium, wherein said first recording means has a first operation mode for evening a surface of the recording medium;

second recording means for recording an image on the recording medium; and

control means for controlling said first and second recording means, wherein said control means controls said first recording means so as to even the surface of the recording medium in the first operation mode during preparation for recording by said second recording means.

4,931,883

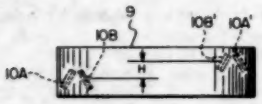
ZERO GUARD-BAND SKIP-FIELD VIDEO CASSETTE RECORDER

Hans-Peter Baumeister, Churchville; William K. Hickok, Brighton; Lawrence J. Bernstein, Honeoye Falls; Matthew DiPietro, Webster, and William T. Hochreiter, Rochester, all of N.Y., assignors to Eastman Kodak Company

Filed Sep. 18, 1986, Ser. No. 908,750

Int. Cl.[5] H04N *5/78*

U.S. Cl. 360—11.1 **7 Claims**



1. A video apparatus useful during non-simultaneous recording operations and playback operations, said apparatus including a rotary head drum having a drum rotation axis, which can record every other field of an interlaced video signal, including successive horizontal synchronization pulses, in adjacent parallel tracks of width W on a video during every other half-rotation of said drum, said apparatus comprising:

first and second magnetic heads disposed together on one side of said drum and being characterized by first and second head gap azimuth angles, respectively; and

third and fourth magnetic heads disposed together on an opposite side of said drum and being characterized by said first and second head gap azimuth angles, respectively, wherein said first and second heads are offsettable from one another by an aligning drum rotation angle such that the successive horizontal synchronization pulses recorded by respective ones of said first and second heads in adjacent ones of said parallel tracks are in spatial alignment along the length of said tracks,

wherein the tracks of every other pair of said tracks are linearly offset by a distance defined in that said aligning drum rotation angle corresponds to the drum rotation angle subtended over an arc distance equal to half said distance.

4,931,884

SKEW COMPENSATION CIRCUIT EFFECTIVELY OPERATED DURING READOUT IN A REVERSE SENSE

Yoshitaka Aoki, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Sep. 9, 1988, Ser. No. 242,447

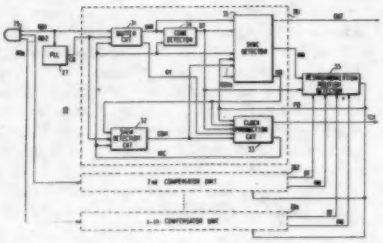
Claims priority, application Japan, Sep. 10, 1987, 62-226976

Int. Cl.[5] G11B *20/20*

U.S. Cl. 360—26 **3 Claims**

1. A skew compensation circuit operable in response to a plurality of readout signal sequences read out of a plurality of tracks of a magnetic tape, respectively, driven in a selected one of normal and reverse senses, each of said readout signal sequences being composed of a start code, an end code, a plurality of resynchronization codes interspersed between said start and said end codes, a plurality of standard data parts between said start code and a leading one of said resynchronization codes and between two adjacent ones of said resynchronization codes, and an additional data part between a trailing one of said resynchronization codes and said end code, each of said standard data parts having a standard length for arranging a preselected number of data signals while said additional data part has an additional length which is not longer than said standard length, said start, said end, and said resynchronization codes of the respective readout signal sequences being produced simultaneously with one another unless a skew is present among said tracks, said skew compensation circuit being for compensating for said skew among said tracks and comprising:

counting means individually supplied with said readout signal sequences read out of the magnetic tape driven in said selected one of the normal and the reverse senses for individually counting numbers of said data signals of the



standard and the additional data parts in response to the start, the end, and the resynchronization codes derived from the respective tracks to produce data number signals representative of said numbers of the data signals arranged in said standard and said additional parts on the respective tracks; and

processing means coupled to said counting means for statistically processing said data number signals to detect the additional lengths of the additional data parts and to determine a position which said trailing one of the resynchronization codes has in each readout signal sequence read out while said magnetic tape is driven in said reverse sense.

4,931,885

METHOD OF CROSS-CHECKING DATA BLOCK IDENTIFICATION SIGNALS OF DATA REPRODUCED FROM A MAGNETIC TAPE RECORD

Roland Mester, Darmstadt; Rolf Loos, Eppertshausen; Jürgen Heitmann, Alsbach-Hähnlein, and Jürgen Müller, Griesheim, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed May 24, 1988, Ser. No. 198,135

Claims priority, application Fed. Rep. of Germany, Jun. 3, 1987, 3718566

Int. Cl.[5] G11B *5/09*

U.S. Cl. 360—48 **9 Claims**

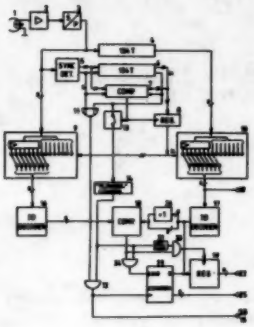
1. Method of reproducing data recorded in oblique tracks on a magnetic tape by means of a plurality of magnetic heads mounted on a head-wheel, when the data is recorded in blocks each preceded by synchronizing and identification signals, comprising the steps of:

delaying the identification signal of a preceding block,

comparing the undelayed identification signal of a block being read from the tap with the delayed identification signal of said preceding block to provide a comparison result signal which is either a consistency-indicating signal or an inconsistency-indicating signal;

in the event of obtaining a consistency-indicating result signal, accepting the undelayed identification signal as valid, and

in the event of obtaining an inconsistency-indicating result signal, producing a provisionally acceptable identification



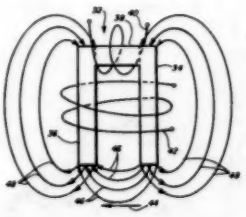
signal by incrementing a portion of the delayed identification signal of said preceding block.

4,931,886

APPARATUS AND METHODS TO SUPPRESS PERPENDICULAR FIELDS IN LONGITUDINAL RECORDING

Michael L. Mallary, Berlin, Mass., assignor to Digital Equipment Corporation, Maynard, Mass.

Filed Jun. 29, 1988, Ser. No. 212,876
Int. Cl.[5] G11B *5/02, 5/17, 5/127*
U.S. Cl. 360—55 **53 Claims**



1. For a longitudinal type magnetic recording head used for recording magnetic recording media, said recording head including a first pole piece, a second pole piece and a flux conductive bridge connecting said first pole piece with said second pole piece, a non-magnetic gap between adjacent ends of said first and second pole pieces and a primary magnetic field across said gap between said first and second pole pieces generated by an electric input signal, a method of reducing a perpendicular magnetic field component of said primary magnetic field relative to said gap proximate a selected one of said first and second pole pieces, comprising the steps of:

generating a secondary magnetic field with said electric input signal, and said first and second pole pieces as a common pole of said secondary magnetic field, to form a localized perpendicular secondary field component opposed to said perpendicular field component proximate said selected one of said first and second pole pieces; and

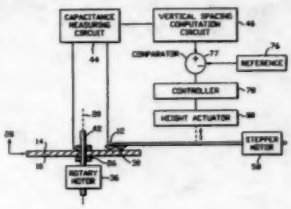
proportioning said secondary magnetic field relative to said primary magnetic field to reduce said perpendicular field component of said primary magnetic field proximate said selected one of said first and second pole pieces.

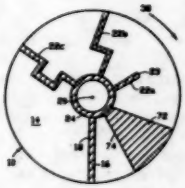
4,931,887

CAPACITIVE MEASUREMENT AND CONTROL OF THE FLY HEIGHT OF A RECORDING SLIDER

Suryanarayan G. Hegde, Hollowville; Robert A. Scranton, South Salem, and Edward J. Yarmchuk, Mahopac, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Feb. 1, 1988, Ser. No. 151,134
Int. Cl.[5] G11B *5/60, 17/32*
U.S. Cl. 360—75 **41 Claims**





1. A device for determining the vertical spacing between two objects, said device comprising:

a first object having a surface, said first object having a first electrically conductive pattern at its surface, said first pattern having an edge with a length extending in a first direction, said first pattern having a width transverse to the length of the edge of the first pattern;

a second object having a surface arranged opposite the surface of the first object, the surface of the second object being spaced from the surface of the first object in a vertical direction, said second object having a second electrically conductive pattern at its surface, said second pattern having a length extending in a second direction and a width extending in a third direction transverse to the second direction, said first and second objects being arranged such that the length of the edge of the first pattern is transverse to the length of the second electrically conductive pattern, the length of the edge of the first pattern exceeding the width of the second pattern, the width of the first pattern being less than the length of the second pattern;

means for moving said first and second objects relative to one another in a direction transverse to the vertical direction and transverse to the edge of the first pattern so as to scan the edge of the first pattern across the second pattern;

means for measuring the electrical capacitance between the first and second electrically conductive patterns, said measuring means producing an electrical measurement signal proportional to the electrical capacitance between the first and second electrically conductive patterns as a function of time; and

means for processing the electrical measurement signal to produce a vertical spacing signal proportional to the vertical spacing between the first and second objects, said means for processing the electrical measurement signal

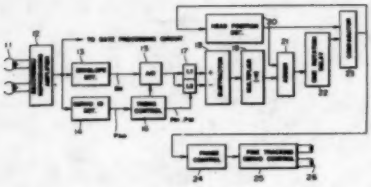
comprising means for computing the first time derivative of the electrical measurement signal to produce a first time derivative signal proportional to the vertical spacing between the first and the second objects.

4,931,888

TRACKING SERVO CONTROL FOR DISC DRIVE

Keiich Taguchi, and Kaoru Yanamoto, both of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Oct. 27, 1988, Ser. No. 263,407
Claims priority, application Japan, Oct. 31, 1987, 62-276877
Int. Cl.[5] G11B *5/596*
U.S. Cl. 360—77.04 **6 Claims**



1. A tracking servo control system for a disc memory comprising:

at least one disc medium on which a plurality of concentric data tracks are provided for recording and/or reproducing data signals thereon and on which servo sectors are provided for prerecording servo signals;

transducer means for recording and/or reproducing said data signals and for reproducing said servo signals;

actuator means for moving said transducer means in the radial direction of said disc medium;

first detecting means for detecting tracking error in accordance with said servo signals reproduced by said transducer means, said tracking error being representative of the difference between the position of said transducer means and the position of a desired data track to which said transducer means should be positioned;

second detecting means for detecting a current position of said transducer means;

adding means for adding said tracking error from said first detecting means and said current position of said transducer means from said second detecting means;

delay means receiving the added data from said adding means for delaying said added data for a period corresponding to at least one rotation of said disc medium;

comparing means for comparing said current position of said transducer means from said second detecting means with the delayed signal from said delay means; and

tracking servo control means for controlling said actuator means in accordance with an output signal from said comparing means, whereby said transducer means is positioned on said desired track.

4,931,889

METHOD AND APPARATUS DEPENDING ON THE SELECTED POWER SOURCE FOR CONTROLLING THE POSITIONING OF A RECORDING/REPRODUCING APPARATUS

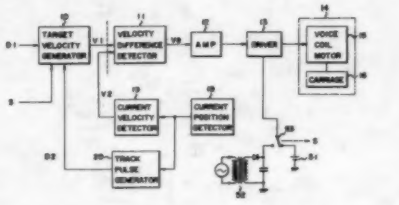
Koji Osafune, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed May 27, 1988, Ser. No. 200,051
Claims priority, application Japan, May 30, 1987, 62-136269
Int. Cl.[5] G11B *21/08*
U.S. Cl. 360—78.07 **7 Claims**

7. A method for efficiently controlling the positioning in a recording/reproducing apparatus irrespective of the kinds of power supplies, characterized by comprising:

selecting one of a first power supply and a second power supply by a switch;

generating a mode select signal in association with said selecting; and



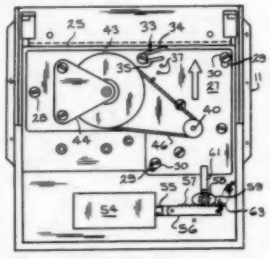
generating target velocity data from incoming target position data and current position data in accordance with said mode select signal.

4,931,890

TAPE PLAYER ASSEMBLY HAVING A CAPSTAN MOUNTED ON A PIVOTAL PLATE

Bernard A. Cousino, Fort Myers, Fla., assignor to Cousino Microloop Corporation, Toledo, Ohio

Filed Aug. 10, 1988, Ser. No. 230,370
Int. Cl.[5] G11B *15/00*
U.S. Cl. 360—93 **8 Claims**



1. A tape player assembly for continuous loop magnetic tape cartridges comprising, a housing having an opening for receiving a tape cartridge in a predetermined position, such tape cartridge having a pressure roller, a plate member pivotally mounted on said housing, a transducer head positioned adjacent said predetermined position, a motor mounted on said plate member, a capstan assembly mounted on said plate member adjacent said predetermined position in an engaging relationship with such pressure roller, said capstan assembly being operatively connected to said motor, and drive means for pivoting said plate member whereby said capstan assembly can be spaced from such pressure roller when such tape cartridge remains in such predetermined position, said drive means comprising a drive solenoid having a plunger, a cam mounted adjacent said plate member and operatively connected to said plate member and connecting means between said plunger and said cam whereby movement of said plunger rotates said cam and pivots said plate member.

4,931,891

MAGNETIC DISC PLACK LOADING MECHANISM WITH SHUTTER OPENING AND CLOSING MECHANISM

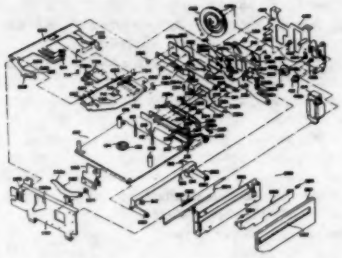
Shigeru Ando, Minato, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Division of Ser. No. 129,115, Dec. 4, 1987, Pat. No. 4,879,616. This application Aug. 8, 1989, Ser. No. 390,859

Claims priority, application Japan, Dec. 4, 1986, 61-289820; Dec. 15, 1986, 61-298412

Int. Cl.[5] G11B *5/012*

U.S. Cl. 360—99.06 2 Claims



1. A magnetic disc pack loading mechanism for positioning a magnetic disc pack in a recording or reproducing position by moving a pack holder containing said magnetic disc pack therein in the same direction with the insertion direction of said magnetic disc pack and thereafter moving said pack holder in the longitudinal direction of a rotary drive shaft perpendicular to said magnetic disc pack insertion direction, said magnetic disc pack loading mechanism comprising:

a slide plate movable together with said pack holder only in said rotary drive shaft direction when said magnetic disc pack is positioned;

a shutter opening member provided in said slide plate and adapted such that, with a portion thereof being projected into an area for insertion of said magnetic disc pack within said pack holder, it can remove the locking of a shutter provided in said magnetic disc pack, and it can open fully said shutter of said magnetic disc pack stored in said pack holder when said pack holder is moved up to the extreme end of advancement thereof in said magnetic disc pack insertion direction; and,

a shutter closing member provided with a claw engageable with a bore formed in the side face of said shutter and arranged in said slide plate such that said claw is disposed in a predetermined position with respect to said shutter opening member, said claw being able to resiliently project into said magnetic disc pack insertion area within said pack holder.

4,931,892

LONG LIFE MAGNETORESISTIVE HEAD OF THE NON-SHUNT BIAS TYPE

Frederick E. Spada, Carlsbad, Calif., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jul. 28, 1988, Ser. No. 225,127

Int. Cl.[5] G11B *5/30*

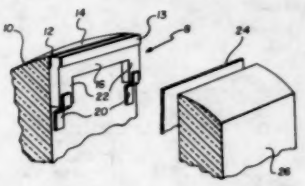
U.S. Cl. 360—113 10 Claims

1. A MR magnetic head of the non-shuntbiased type comprising

a. non-magnetic support means having a media contacting surface,

b. A MR element supported by said support means at said media contacting surface and having a quiescent resistance thereto and

c. A layer of electrically conductive, electrochemically sacrificial non-antiferromagnetic material supported at said media contacting surface, and in electrical contact



with said MR element, said layer being sufficiently thin that the resistance thereof is significantly greater than the resistance of said MR element.

4,931,893

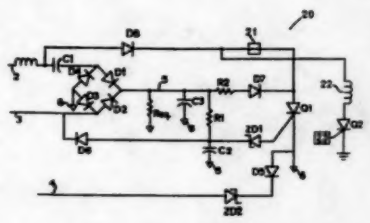
LOSS OF NEUTRAL OR GROUND PROTECTION CIRCUIT

Oliver Glennon, Ballinasloe, Ireland, and Henry J. Zylstra, Alburnett, Iowa, assignors to Square D Company, Palatine, Ill.

Filed Apr. 19, 1989, Ser. No. 340,302

Int. Cl.[5] H02H *3/16*

U.S. Cl. 361—45 15 Claims



1. A loss of neutral or ground protection circuit in a system having line, neutral and ground leads between a source of energy and a load, said protection circuit comprising:

a device for opening the line lead or indicating a fault on reception of an energizing signal; and

control means for controlling operation of said device, said control means comprising a capacitive circuit arranged to be charged by the line lead, and to subsequently discharge through the neutral lead for detection of loss of neutral or through the ground lead for loss of ground detection, in which the capacitive circuit charges on loss of the neutral lead or loss of the ground lead to provide an energizing signal for said device.

4,931,894

GROUND FAULT CURRENT INTERRUPTER CIRCUIT WITH ARCING PROTECTION

Raymond Legatti, Clearwater, Fla., assignor to Technology Research Corporation, Clearwater, Fla.

Filed Sep. 29, 1989, Ser. No. 414,841

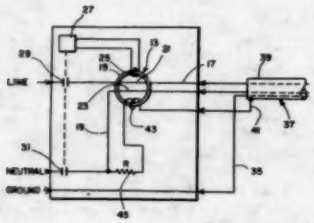
Int. Cl.[5] H02H *3/26*

U.S. Cl. 361—45 5 Claims

1. A ground fault current interrupter circuit for use with a system including a power line and a neutral line in a cable having a metal sheath comprising:

a differential transformer having a pair of opposed primary windings and a secondary winding located on the core thereof;

circuit opening means to break the power line when a trip signal is produced in said secondary winding by an imbalance in said differential transformer resulting from a ground fault; and



arc protection means responsive to arcing between the power line and the metal sheath to cause actuation of said circuit opening means to break the power line.

4,931,895

ELECTRICAL TRANSIENT SURGE PROTECTION

Edward F. Allina, 605 Capri Blvd., Treasure Island, Fla. 33706

Filed Oct. 28, 1986, Ser. No. 923,524

Int. Cl.[5] H02H *9/04*

U.S. Cl. 361—56 **7 Claims**

1. Adapter means used in retrofitting electrical utility watthour meters with protection against surge damage from lightning or other transient source, comprising a housing member provided with

power input and power output terminals, adapted to plug into external socket means into which such a meter normally plugs;

socket terminals, into which such a meter is likewise equipped to plug, connected respectively to the plug terminals;

varistor means connected between at least one such power input terminal and external grounding means, and

electrically and thermally conductive heat-sink means connected between and to the varistor means and the grounding means.

4,931,896

DISTRIBUTION LINE SWITCHGEAR CONTROL WITH ISOLATED CASCADED POWER SUPPLIES

William N. LeCourt, Milwaukee, Wis., assignor to Cooper Industries, Inc., Houston, Tex.

Filed Mar. 14, 1985, Ser. No. 712,012

Int. Cl.[5] H02H *7/22*

U.S. Cl. 361—73 **5 Claims**

1. A distribution line switchgear control comprising:

a power source operatively connected to at least one phase of the distribution line for replenishing the power consumed by said switchgear control;

a charging power source operatively connected to at least one phase of the distribution line for supplying sufficient power to establish a preselected initial energy level in said switchgear control;

power rectifier means for rectifying alternating current obtained from the distribution line;

a positive power bus operatively connected to an anode of said rectifier means;

a negative power bus operatively connected to a cathode of said rectifier means;

a voltage regulating means governing a maximum voltage difference between said positive and negative power buses;

a trip energy storage device connected between said negative and positive power buses for storing trip energy;

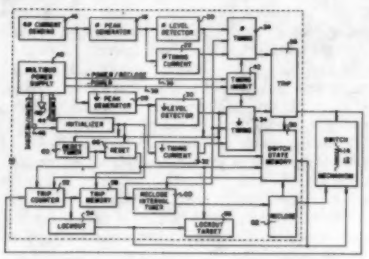
a reclose energy storage device, is gated from said trip energy storage device, having two terminals, a first terminal of which is connected to a power bus;

a reclose energy bus connected to a second terminal of said reclose storage device;

a reclose diode connected between the second terminal of said reclose energy storage device and the other power bus, said recloser diode oriented to prevent said reclose energy storage device from discharging into the power buses;

a reserve energy storage device having two terminals, a first terminal of which is connected to a terminal of said reclose energy storage device;

a reserve energy bus connected to a second terminal of said reserve energy storage device;



a reserve diode connected between the second terminal of said reserve energy storage device and the other terminal of said reclose energy storage device, said reserve diode oriented to prevent said reserve energy storage device from discharging into the other terminal of said reclose energy storage device, said reserve, reclose and trip energy storage devices establishing a energy level of said switchgear control;

sensing means for determining the presence of preselected level of current in each phase of the distribution line and for providing a current present signal when a preselected value of current is present or exceeded by the distribution line current;

trip timing means responsive to the current present signal for determining the presence and duration of the current present signal, and for providing a current duration signal when the duration of the current present signal exceeds a preselected current time interval;

trip means connected between said positive and said negative power bus and responsive to the current duration signal for issuing a trip signal which causes a switch in the switchgear to open;

a trip counter powered by said energy buses for counting the number of times a trip signal is issued the sequential outputs of the trip counter being selectable to activate the various control sequential operating devices;

a trip memory which retains a non-volatile record of the number of times a trip signal is issued;

a reclose interval timer, powered by said energy buses, for determining a preselected reclose interval from a defined event and issuing a reclose interval signal;

reclose means connected to said reclose bus and responsive to the reclose interval signal for issuing a close signal which causes the switch of the switchgear to close;

a reset timer, powered by said energy buses, for determining the reset interval after a close signal and issuing a reset interval signal which returns said trip counter to its initial state;

timing inhibit means for monitoring the voltage between said power buses to determine whether the power bus voltage exceeds a preselected minimum power bus voltage and for issuing an inhibit signal which prevents the issuance of a trip signal if the power bus voltage is less than the minimum power bus voltage;

an initializer for monitoring the voltage between the energy buses to determine whether the energy bus voltage exceeds a preselected minimum energy bus voltage and for issuing an initialization signal shortly before the energy bus voltage exceeds the minimum energy bus voltage, the initialization signal returning volatile state devices including said trip counter to its initial state;

state memory means, which is non-volatile and relatively coercive, said state memory means responsive to the trip and the close signals for inhibiting said reset timer and enabling said reclose interval timer, when a trip signal was lost issued, and for enabling said reset timer and inhibiting said recloser interval timer when the trip signal was not the last issued, said timers being returned to their initial states when inhibited; and

reset means responsive to the reset interval signal and the initialization signal to return all non-volatile state devices including said trip memory and said state memory to their initial states.

4,931,897

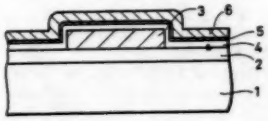
METHOD OF MANUFACTURING SEMICONDUCTOR CAPACITIVE ELEMENT

Katsuhiro Tsukamoto; Masahiro Shimizu, and Hiroshi Miyatake, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 7, 1989, Ser. No. 390,012

Int. Cl.[5] H01G *4/10, 7/00*; B01J *17/00*; H01L *27/02*

U.S. Cl. 361—313 **17 Claims**



16. A capacitor formed on a semiconductor substrate, comprising:

a first electrode being a polycrystalline silicon layer including impurities for increasing a conductive rate and having an amorphous silicon surface layer;

a dielectric layer formed on said first electrode; and

a second electrode formed on said dielectric layer.

4,931,898

LOADCENTER BUSBAR RETENTION

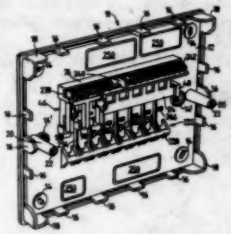
Anthony R. Cole, Swindon, United Kingdom, assignor to Square D Company, Palatine, Ill.

Filed Jan. 17, 1989, Ser. No. 297,903

Claims priority, application United Kingdom, Jan. 14, 1988, 8800849

Int. Cl.[5] H02B *1/00*

U.S. Cl. 361—361 **14 Claims**



1. An electrical consumer unit comprising:

an enclosure formed by a base and a cover;

a live busbar;

means for mounting a plurality of electrical protection devices so as to be fixed in relation to the base and in electrical connection with the busbar;

characterised by means for mounting and retaining said live busbar on the base, comprising:

a boss having an aperture dimensioned to receive one end of the live busbar;

an upstanding formation having a shoulder portion for receiving the live busbar adjacent its other end; and means engageably receiving a clip member to trap the live busbar between said formation and said clip member.

4,931,899

CERAMIC CASED CAPACITOR

Donald N. Pruett, Carson City, Nev., assignor to Sierra Aerospace Technology, Inc., Carson City, Nev.

Filed Jan. 17, 1989, Ser. No. 297,179

Int. Cl.[5] H01G *1/02, 7/00*; H02G *15/08*

U.S. Cl. 361—308 **26 Claims**

1. A capacitor, comprising:

a pair of conductive plates;

a substantially monolithic casing of dielectric material having said pair of conductive plates encased therein in spaced parallel relation, said casing having an exterior surface, and a pair of recessed seats extending into said casing from said exterior surface with sufficient depth for respectively exposing edges of said conductive plates only within said seats;

a pair of conductive leads; and

means for anchoring ends of said conductive leads respectively within said recessed seats, said anchoring means being substantially impervious to moisture penetration;

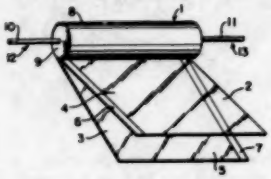
said anchoring means including a conductive frit material lining the surfaces of said casing within said seats, and a selected solder for connecting said leads end first to said frit material.

4,931,900

DIELECTRIC FLUID FOR A METALLIZED FILM CAPACITOR

Edward M. Lobo, Shelton, and Michael F. Berman, Ansonia, both of Conn., assignors to Magnetek Universal Mfg., Corp., Paterson, N.J.

Filed May 10, 1988, Ser. No. 192,373
Int. Cl.[5] H01G 4/22, 13/00
U.S. Cl. 361—315 7 Claims



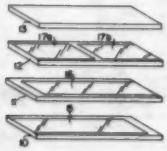
1. A zinc or zinc alloy metallized film capacitor including a dielectric fluid comprising epoxidized soybean oil having at least one epoxy group per molecule and an aromatic ester dielectric, the epoxidized soybean oil mixed with from 1 to 50% of the aromatic ester dielectric from the group consisting essentially of di(2-ethylhexyl) phthalate, diisononyl phthalate, dioxyl sebacate, diisodecyl phthalate, dimethyl phthalate, and diethy phthalate.

4,931,901

METHOD FOR ADJUSTING CAPACITOR AT MANUFACTURE AND PRODUCT

John B. Heron, Jr., Wichita Falls, Tex., assignor to Sprague Electric Company, North Adams, Mass.

Filed May 19, 1989, Ser. No. 354,183
Int. Cl.[5] H01G 1/147, 4/06
U.S. Cl. 361—321 3 Claims



2. A multilayer ceramic capacitor comprising:

(a) a ceramic body having a top face and at least two spaced-apart side faces;

(b) a plurality of mutually parallel spaced-apart film electrodes buried in said ceramic body, each of a first group of said electrodes extending to one of said two side faces and being disposed in overlapping capacitive relationship with at least one other of said electrodes, each of a second group of said electrodes extending to the other side face of said body and being disposed in overlapping capacitive relationship with at least one of said first group electrodes or at least one of another group of said electrodes that also has an overlapping relationship with at least one of said first group electrodes;

(c) at least one pair of spaced-apart coplanar film electrodes buried in said body, one and the other of said pair of coplanar electrodes extending respectively to said one and the other side faces; and

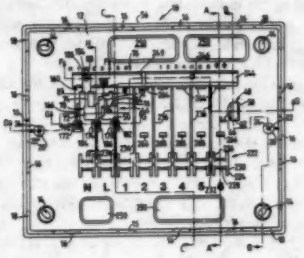
(d) two conductive terminations bonded respectively to said one and the other of said side faces to contact all of said extending electrodes at said respective faces.

4,931,902

BUSHBAR BARRIER PROTECTIVE MEMBERS

Anthony R. Cole, Swindon, United Kingdom, assignor to Square D Company, Palatine, Ill.

Filed Jan. 17, 1989, Ser. No. 297,902
Claims priority, application United Kingdom, Jan. 14, 1988, 8800851
Int. Cl.[5] H02B 1/06, 1/14
U.S. Cl. 361—354 6 Claims



1. An electrical consumer unit comprising a base member and a cover member which together define a box-shaped enclosure, a live busbar secured to the base member, and means for mounting a plurality of electrical protection devices to the base member at predetermined locations and in electrical connection with the live busbar;

characterised by a partition wall upstanding from the base member to extend parallel to the busbar at one side thereof, first locating means on the partition wall adjacent each said location, and second locating means on the base member adjacent each said location at positions parallel to the busbar and on the other side thereof, said first and second locating means being engageable with opposite ends of a laminar cover member to hold the latter across the part of the busbar relating to a respective location when such is not occupied by an electrical protection device.

4,931,903

LOADCENTER MOUNTING RAIL ADAPTER

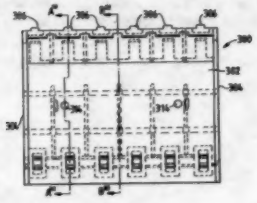
Anthony R. Cole, Swindon, United Kingdom, assignor to Square D Company, Palatine, Ill.

Filed Jan. 17, 1989, Ser. No. 297,908
Claims priority, application United Kingdom, Jan. 14, 1988, 8800852
Int. Cl.[5] H02B 1/00
U.S. Cl. 361—359 6 Claims

1. An adapter for use with an electrical consumer unit comprising a base and a cover together defining a generally box-shaped enclosure, the base defining a plurality of locations for modular subcircuit protection devices and means for retaining such devices in said locations, and the cover having an aperture providing user access to such devices;

the adapter comprising a carrier member arranged and dimensioned to be secured by said retaining means in posi-

tion across a number of said locations, and a mounting rail secured to the carrier member for mounting predetermined types of electrical devices of smaller size than said subcircuit protection devices.

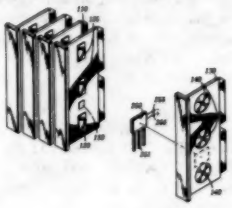


4,931,904

LOCALIZED CIRCUIT CARD COOLING DEVICE

Joseph T. Yiu, Chandler, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed May 30, 1989, Ser. No. 357,846
Int. Cl.[5] H05K 7/20
U.S. Cl. 361—384 **5 Claims**



1. A circuit card cooling device for cooling at least one target circuit card having a predetermined target cooling area and mounted in an electronic system enclosure wherein said electronic system enclosure has at least one unused circuit card mounting location adjacent to said at least one target circuit card, said circuit card cooling device comprising:

fan support means for mounting in said at least one unused circuit card mounting location;

one or more fans mounted on said fan support means, wherein said one or more fans are operated to direct ambient air from within said electronic system enclosure onto said at least one target circuit card; and

electronic cooling means mounted on said fan support means such that ambient air is drawn past and cooled by said electronic cooling means before being directed onto said at least one target circuit card.

4,931,905

HEAT PIPE COOLED ELECTRONIC CIRCUIT CARD

Vincent Cirrito, Massapequa Park; Kevin J. Koubek, South Setauket, and John A. Quadrini, Northport, all of N.Y., assignors to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Jan. 17, 1989, Ser. No. 297,526
Int. Cl.[5] H05K 7/20
U.S. Cl. 361—385 **1 Claim**

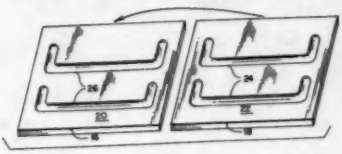
1. An electronic component module comprising:

a first metal card having a plurality of parallel spaced and generally U-shaped grooves formed within a first interior surface thereof;

a second metal card having a plurality of parallel spaced and generally U-shaped grooves formed within a first interior surface thereof;

the first surfaces of each card being attached to the other and the grooves being respectively congruent to form corresponding independent parallel spaced U-shaped sealed heat pipes each having a central section acting as an evaporator section and two parallel legs serving as condenser sections;

a single wick located along the length of each pipe to assist in liquid transport along the pipe;



a two-phase vaporizable liquid present in each heat pipe; and

means contacting the edges of the module for retaining the module in place while being in coincidence with the heat pipe condenser sections for minimizing the thermal resistance of a retained module.

4,931,906

HERMETICALLY SEALED, SURFACE MOUNTABLE COMPONENT AND CARRIER FOR SEMICONDUCTOR DEVICES

Harry C. Reifel, Topsfield; Eren Erdag, Somerville, and Herman V. D. Soerewyn, Peabody, all of Mass., assignors to Unitrode Corporation, Lexington, Mass.

Filed Mar. 25, 1988, Ser. No. 173,370
Int. Cl.[5] H05K 7/20
U.S. Cl. 361—386 **25 Claims**

1. A surface mountable chip carrier adapted to receive at least one semiconductor device comprising:

a plurality of unitary conductive layers each comprising a sheet conductor having a predetermined thickness, a continuous periphery and a first coefficient of thermal expansion;

a plurality of unitary insulating layers each having a predetermined thickness and a continuous periphery and a coefficient of thermal expansion substantially equal to said first coefficient of thermal expansion;

said conductive and insulating layers being joined together to form a unitary body with at least one insulating layer interposed between adjacent conductive layers; said unitary body having a top layer and a bottom layer; and

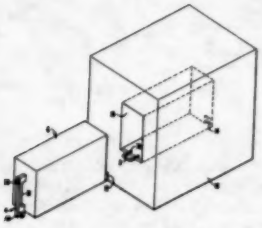
at least some of said conductive and insulating layers having a hole through the respective layers so as to form a cavity within said body adapted to receive said at least one semiconductor device.

4,931,907

ELECTRIC MODULE LATCH ASSEMBLY

Richard P. Robinson, and Joseph S. Neilson, both of Cupertino, Calif., assignors to Tandem Computers Incorporated, Cupertino, Calif.

Filed Mar. 30, 1989, Ser. No. 331,403
Int. Cl.[5] H05K 5/00
U.S. Cl. 361—391 10 Claims



1. An electronic module and integrally mounted latch assembly disposed in a housing, the electronic module including an enabling switch, the electronic module latch assembly comprising:

a U-shaped handle having a first leg, a second leg and a bight connecting the first and second legs, the first and second legs secured to the module, the handle defining a handle plane;

a lever having a latch end and a catch end, the latch end pivotally secured to the handle for pivotal movement in latching and unlatching rotary directions along the handle plane between a latched position, generally parallel to the bight, and an unlatched position, extending away from the bight, the lever sized so that the latch end is adjacent the first leg when the lever is in the latched position;

a catch button having a first catch, facing the catch end, movably mounted to the handle for movement between engaged and disengaged positions;

the catch end including a second catch configured for mating engagement with the first catch when the first catch is in the engaged position and the lever is in the latched position so to prevent movement of the lever in the unlatching direction;

a keeper, having a latch surface, mounted to the housing;

the latch end of the lever including latch means for engaging the latch surface to pull the module into and force the module from the housing when the lever is rotated in the latching and unlatching directions, respectively; and

a spring biased disenable switch element movably mounted to the handle to engage the lever so to move between enable and disenable positions as the lever is moved between the latched and unlatched positions, respectively, the disenable switch element sized to extend to the enable switch to actuate the enable switch carried by the module only when the switch element is in the enable position.

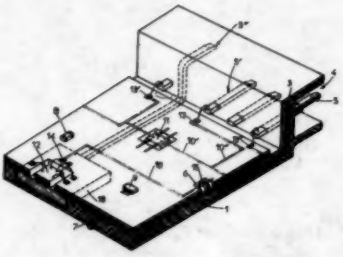
4,931,908

HOUSING FOR AN ELECTRONIC CIRCUIT

Michel R. J. Boucard, Tournefeuille, and Thirion C. Francois, Auterive, both of France, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Mar. 20, 1989, Ser. No. 325,631
Claims priority, application France, Mar. 30, 1988, 88 04199
Int. Cl.[5] H05K 1/14
U.S. Cl. 361—395 6 Claims

1. Housing for an electronic circuit, comprising a bottom onto which is fixed a substrate made of insulating material, at least one surface of which carries active and/or passive components and electrical conductor tracks or bands connecting the components to one another, and/or electrical contact pins emerging outside the housing so as to ensure interconnection of the circuit contained inside the housing with at least one electrical and/or electronic apparatus associated with and located outside the housing, characterized in that at least one (5) of the pins extends inside the thickness of the wall of the bottom (1) of the housing so as to pass through the surface of



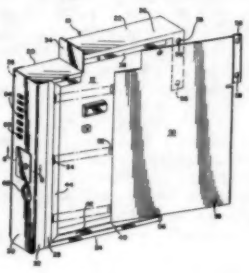
the bottom of the housing which supports the substrate and pass into an opening (6) formed in the substrate so as to present one end in the form of a contact terminal (15) which lies flush with the surface of the substrate carrying the conductor tracks or bands, at least one (10) of these tracks or bands passing above this opening in such a way as to be in electrical contact with this contact terminal of the pin.

4,931,909

ALIGNING BRACKET FOR A CIRCUIT BOARD IN A CIRCUIT BOARD HOUSING

James J. Backes, Hales Corners, Wis., assignor to Square D Company, Palatine, Ill.

Filed Mar. 13, 1989, Ser. No. 322,798
Int. Cl.[5] H05K 7/02
U.S. Cl. 361—399 3 Claims



1. A housing including a circuit board, the housing comprising:

a base having an upstanding front wall and side walls,

a removable cover enclosing said base, said front wall of said base having spaced slots and said removable cover having projections received into said slots so that said cover can be positioned over said base by manipulation thereof relative to said base,

fastener means for releasably retaining said cover on said base,

a circuit board secured to said base and having a plurality of components thereon, said front wall having openings for receiving said components with means for securing said

circuit board to said base and maintaining alignment between said openings and said components, and

a bracket disposed on said circuit board adjacent said front wall and defining a battery holder, said front wall including a front wall opening aligned with said bracket, said bracket including locator means for alignably positioning said circuit board within said housing.

4,931,910

LIGHTING DEVICES

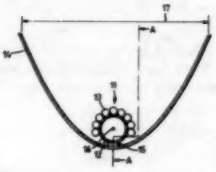
Kenneth F. Wills, Yeovil, England, assignor to Saunders-Roe Developments Limited, Middlesex, England

Filed Feb. 24, 1989, Ser. No. 315,095

Claims priority, application United Kingdom, May 6, 1988, 8812495

Int. Cl.[5] F21K *2/06*

U.S. Cl. 362—34 **8 Claims**



1. A lighting device comprising a light carrier of tubular form defining an internal cylindrical surface and an external cylindrical surface, and a plurality of tubular self luminous light sources each having a smaller outside diameter than the outside diameter of the tubular carrier attached longitudinally along one of said cylindrical surfaces of the carrier and through at least a major arc of the circumference of said one surface.

4,931,911

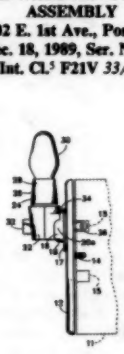
NONREMOVABLE WALL-MOUNTED NIGHT LIGHT ASSEMBLY

Curtis O. Hanson, 102 E. 1st Ave., Post Falls, Id. 83854

Filed Dec. 18, 1989, Ser. No. 452,798

Int. Cl.[5] F21V *33/00*

U.S. Cl. 362—95 **6 Claims**



1. A nonremovable night light assembly adapted for attachment to an electrical outlet box comprising, in combination:

(a) an electric night light comprising an illuminating end and a connecting end, said ends disposed at a 90° angle to one another, said connecting end including a pair of prongs for connecting to an electrical outlet disposed within said outlet box; and

(b) an electrical outlet cover comprising a generally planar plate having fastening means for connecting said cover to said outlet box and including a receiving flange for fixedly holding said night light therein in predetermined relation to said electrical outlet when said cover plate is attached to said outlet box wherein said receiving flange includes a bottom wall and a pair of side walls for frictionally engaging said connecting end of said night light, and an upper wall extending across a portion of said illuminating end forming a stop for regulating the penetration depth of said prongs into said electrical outlet.

4,931,912

SQUARE HEADLAMP FOR AUTOMOBILE

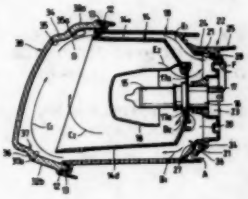
Tamaki Kawakami; Masayasu Endo, and Toshiyuki Katsumata, all of Shizuoka, Japan, assignors to Koito Manufacturing Co., Ltd., Tokyo, Japan

Filed Mar. 31, 1989, Ser. No. 331,324

Claims priority, application Japan, Apr. 18, 1988, 63-50960[U]; Apr. 22, 1988, 63-53519[U]

Int. Cl.[5] B60Q *1/02*

U.S. Cl. 362—61 **5 Claims**



1. In a rectangular headlamp for an automobile having a rectangular front lens attached to a rectangular open front of a lamp body and the lamp body has air passage means for communicating the interior of said headlamp with the exterior thereof, the improvement wherein a stepped portion is formed at an upper side edge portion of a front face of said front lens projecting from a rear side of said front lens and spaced from a peripheral side edge portion of said lens between said front face and said lamp body, said stepped portion extending along an upper edge of said front lens in inclined relation to said upper edge.

4,931,913

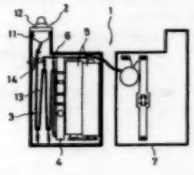
PORTABLE SIRENING AND ILLUMINATION DEVICE

Feng-Lin Hwang, No. 21, Pa Te Rd., Chi Tu District, Keelung City, Taiwan

Filed May 26, 1989, Ser. No. 357,931

Int. Cl.[5] F21L *15/22*

U.S. Cl. 362—103 **1 Claim**



1. A portable siren and illumination device comprising in combination:

a casing having a fastening belt for buckling onto wrist or other part of a user; a main body, and a cover body;

an illumination assembly having a power lead which is able to be drawn outward;

an automatic power lead return assembly that includes a plurality of pullies, a plurality of springs, and a position clamp,

said power lead having a flexible sleeve and a back end

thereof connected to a circuit and having a portion winding amid said pullies;

said pullies, being connected to said plurality of springs, said pullies and springs being positioned and arranged in two opposite sides of said casing, and said power lead by means of a drawing force exerted on said strips being and held tight amid said pullies;

said power lead moving past a position clamp;

said position clamp having a fixed piece and an eccenter, which can clamp or release;

said power lead returning into said casing by means of a drawing force from said spiral springs and being held in and extended position by the friction force between said power lead and said position clamp; and

a PC board for producing siren sounds and for producing flashes from said illumination assembly; and

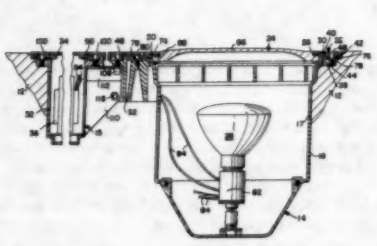
wherein said device is able to be used for illumination and for distress call at emergency.

4,931,914

BALLAST AND OPTICAL HOUSINGS FOR GRADE MOUNTED LIGHT FIXTURE

Honesto D. Quiogue, Florence, Ky., assignor to Hubbell Incorporated, Orange, Conn.

Filed Mar. 23, 1989, Ser. No. 327,547
Int. Cl.[5] F21V *23/00*
U.S. Cl. 362—265 **15 Claims**



1. A light fixture, comprising:

an optical housing including an open top, a hollow base depending from said open top and a wiring chamber extending laterally from said base adjacent said open top;

an optical cover coupled to said optical housing over said open top, said cover having an aperture extending therethrough;

a light transparent lens mounted in said aperture;

a lamp mounted in said base of said optical housing for directing light through said lens;

a ballast housing releasably coupled to said optical housing at said wiring chamber;

a ballast cover coupled to said ballast housing;

an electrical ballast assembly mounted in said ballast housing; and

wiring means, extending between said housings, for electrically connecting said lamp and said electrical ballast assembly.

4,931,915

SEALING SYSTEM FOR GRADE MOUNTED LIGHT FIXTURE

Honesto D. Quiogue, Florence, Ky., assignor to Hubbell Incorporated, Orange, Conn.

Filed Mar. 23, 1989, Ser. No. 327,546
Int. Cl.[5] F21V *31/00*
U.S. Cl. 362—267 **21 Claims**

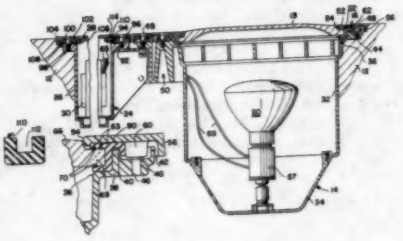
1. A light fixture, comprising:

a lamp housing having a hollow interior and an open top;

a removable cover releasably coupled to said housing extending over and laterally beyond said open top, said cover having an aperture extending therethrough and depending ribs;

a light-transparent lens mounted in said aperture;

a lamp mounted within said interior of said housing for directing light through said lens; and



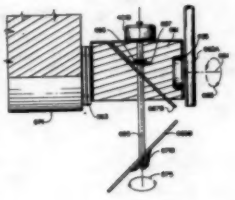
gasket means, mounted between said lens, said cover and said housing, for sealing joints therebetween, said gasket means being confined between said ribs to ensure proper alignment of said gasket means.

4,931,916

APPARATUS FOR MECHANICALLY ADJUSTING LIGHTING FIXTURE BEAM AZIMUTH AND ELEVATION

Michael Callahan, 40 W. 94th St., New York, N.Y. 10025

Continuation-in-part of Ser. No. 940,934, Dec. 12, 1986, Pat. No. 4,769,743, which is a continuation-in-part of Ser. No. 750,873, Jul. 1, 1985, Pat. No. 4,697,227. This application Aug. 8, 1988, Ser. No. 229,581
Int. Cl.[5] G03B *15/02*
U.S. Cl. 362—272 **21 Claims**



1. Apparatus for remotely adjusting a beam of light in two axes comprising: a first support; a light source coupled to the first support; means for forming a beam suitable for entertainment lighting, said beam directed along a first axis fixed in relation to said first support; a second support mechanically coupled to said first support so as to permit rotation of at least said second support substantially about said first axis; a first remotely-adjustable means for rotating at least said second support about said first axis; first means for redirecting said beam along a second axis, said first means for redirecting mechanically coupled to said second support such that said first axis extends through said first means for redirecting and said beam is incident upon said first means for redirecting in all angular positions of said second support about said first axis within the range of beam adjustment; a third support mechanically coupled to said second support so as to permit rotation of said third support substantially about said second axis; a second remotely-adjustable means for rotating said third support about said second axis; second means for redirecting said beam along a third axis, said second means for redirecting mechanically coupled to said third support such that said second axis extends through said second means for redirecting in all angu-

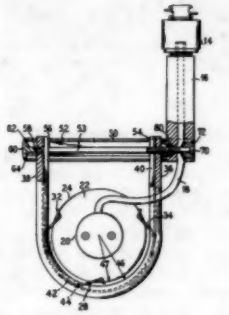
lar positions of said third support about said second axis within the range of beam adjustment; wherein said second support is rotationally supported about said first axis at a point beyond said incidence of said beam upon said first means for redirecting.

4,931,917

TRAPEZE LIGHTING FIXTURE

Timothy P. Scherf, Tustin; Daniel J. Dix, Irvine, and Douglas W. Carson, Downey, all of Calif., assignors to Thomas Industries Inc., Louisville

Filed Jul. 21, 1988, Ser. No. 222,038
Int. Cl.[5] F21V *21/28*
U.S. Cl. 362—371 **17 Claims**



1. An adjustable fixture for holding a lamp of the type having a rim, comprising:

frame means at least partially surrounding said lamp and having engagement means projecting inwardly therefrom for securely holding said lamp at a position entirely spaced from said frame means; and

support means having at one end connection means for attachment to a source of electric current, and at an opposite end rotationally attached to said frame means such that said frame means is rotatable relative to said support means about a rotational axis, yet permanently held in a fixed axial position relative to said support means.

4,931,918

RINGING CHOKE CONVERTER

Kiyoharu Inou; Yoshiaki Koide, and Yasunobu Iwata, all of Tokyo, Japan, assignors to Yokogawa Electric Corporation, Tokyo, Japan

Filed Jul. 10, 1989, Ser. No. 377,517
Claims priority, application Japan, Jul. 29, 1988, 63-189861; Jul. 29, 1988, 63-189862
Int. Cl.[5] H02M *3/335*
U.S. Cl. 363—19 **6 Claims**

1. A ringing choke converter power supply device comprising

a ringing choke converter power supply in which an output voltage is stabilized by an indirect feedback system;

a saturable reactor provided on a primary or secondary side of said ringing choke converter power supply; and

a control circuit for transmitting a control signal to said saturable reactor in such a direction that an error signal becomes zero by making a comparison between an output voltage of said ringing choke converter power supply and a predetermined reference voltage; wherein said ringing choke power supply comprises

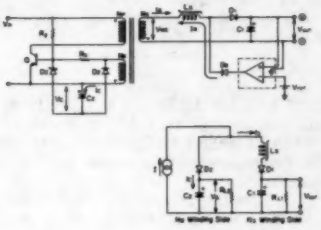
a transformer in which a DC input voltage is impressed on an anode of a primary winding thereof;

a switching element having an input terminal to which a cathode of said primary winding is connected, and an output terminal to which a reference voltage line on an input side is connected;

a secondary circuit for outputting a DC voltage by rectification smoothing a switching signal generated in a secondary winding of said transformer;

a voltage detecting winding provided in said transformer;

a current limit resistance interposed between said voltage detection winding and a control terminal of said switching element;



a feedback diode having a cathode and connected to a connecting point between said voltage detection winding and said current limit resistance;

a Zener diode having a cathode end thereof connected to a connecting point between said current limit resistance and said control terminal of said switching element; and

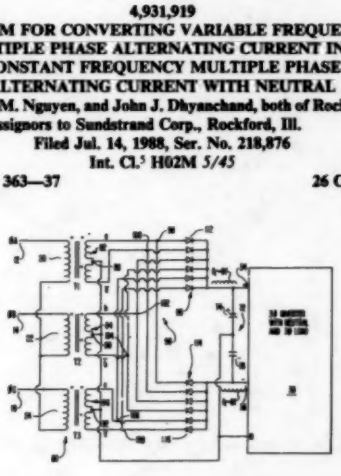
a capacitor for connecting said reference voltage line to said connecting point between said feedback diode and said Zener diode.

4,931,919

SYSTEM FOR CONVERTING VARIABLE FREQUENCY MULTIPLE PHASE ALTERNATING CURRENT INTO CONSTANT FREQUENCY MULTIPLE PHASE ALTERNATING CURRENT WITH NEUTRAL

Vietson M. Nguyen, and John J. Dhyanchand, both of Rockford, Ill., assignors to Sundstrand Corp., Rockford, Ill.

Filed Jul. 14, 1988, Ser. No. 218,876
Int. Cl.[5] H02M *5/45*
U.S. Cl. 363—37 **26 Claims**



1. A system for converting variable frequency multiple phase current into multiple phase current of constant frequency with a neutral comprising:

a multiple phase transformer having a plurality of inputs equal to a number of phases present in the variable frequency current which are respectively connected to different primary windings, a plurality of secondary windings each respectively magnetically coupled to a different primary winding and having a pair of terminals, the neutral being coupled to a center tap of each of the secondary windings;

a single full-wave rectification means having inputs coupled

to each of the first and second terminals of the secondary windings and first and second outputs respectively coupled to first and second inputs of a multiple phase inverter, the first input receiving positive pulses and the second input receiving negative pulses, the pulses having a frequency f_r equal to 2nf with respect to the neutral wherein n is the number of phases of the variable frequency multiple phase current and f is a fundamental frequency of the variable frequency multiple phase current; and

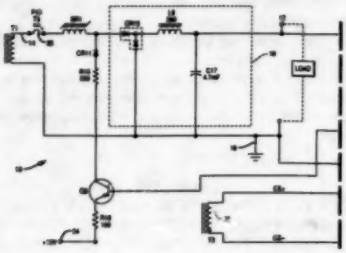
a pair of capacitors coupled in a series circuit with the series circuit having a first terminal coupled to the first input, a second terminal coupled to the second input and a junction between the pair of capacitors being coupled to the neutral.

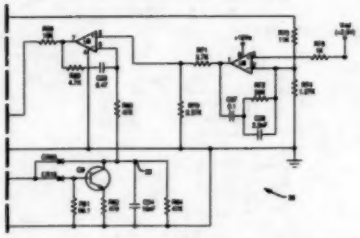
4,931,920

CIRCUIT AND METHOD FOR REGULATING OUTPUT VOLTAGE OF A SWITCH MODE POWER SUPPLY HAVING A CURRENT MODE MAGNETIC AMPLIFIER

Mark P. Barker, Deltona, Fla., assignor to NCR Corporation, Dayton, Ohio

Filed Jun. 16, 1989, Ser. No. 367,283
Int. Cl.[5] H02M *3/28*
U.S. Cl. 363—82 **15 Claims**





1. A circuit for generating a tracking voltage proportional to a current comprising:

a current transformer having a primary and secondary winding with said primary winding receiving said current and said secondary winding having a first resistor connected in parallel therewith to develop a pulsating voltage;

a capacitor connected between a storage terminal and first reference potential terminal for converting said pulsating voltage to said tracking voltage and storing said tracking voltage;

a series connected transistor and second resistor connected in parallel with said capacitor;

a first diode with its anode connected to said secondary winding and its cathode connected to said storage terminal; and

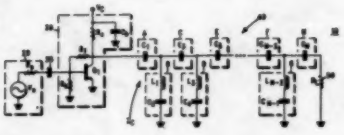
a second diode connected between the anode of said first diode and the control electrode of said transistor, wherein said first resistor is connected between said control electrode and said first reference potential terminal.

4,931,921

WIDE BANDWIDTH FREQUENCY DOUBLER

Dale R. Anderson, Ft. Worth, Tex., assignor to Motorola, Inc., Schaumburg, Ill.

Filed May 30, 1989, Ser. No. 358,330
Int. Cl.[5] H02M *5/293*
U.S. Cl. 363—163 **8 Claims**



1. A frequency multiplier comprised of:

signal amplification means, having an input and an output, for amplifying an input signal and producing an output signal having harmonic frequency multiples of said input signal;

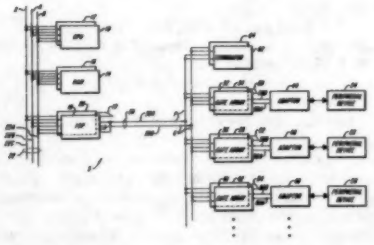
first elliptical filter means having a relatively low input impedance at the frequency of said input to said signal amplification means and a relatively high input impedance at a pass-band frequency range, said first elliptical filter means coupled to said output of said signal amplification means for attenuating electrical signals outside of said pass-band frequency range while substantially passing signals within said pass-band frequency range, said first elliptical filter means passing signals at frequency multiples of said signal input to the amplification means.

4,931,922

METHOD AND APPARATUS FOR MONITORING PERIPHERAL DEVICE COMMUNICATIONS

Kurt F. Baty, Medway, and Joseph M. Lamb, Hopedale, both of Mass., assignors to Stratus Computer, Inc., Marlboro, Mass.

Continuation-in-part of Ser. No. 18,629, Feb. 25, 1987, and Ser. No. 904,827, Sep. 8, 1986, Pat. No. 4,750,177, which is a continuation of Ser. No. 307,436, Oct. 1, 1981, abandoned. This application Jul. 29, 1987, Ser. No. 79,218
Int. Cl.[5] G06F *13/00, 13/42*
U.S. Cl. 364—200 **20 Claims**



1. In a digital data processor having a first input/output controller for communicating with one or more peripheral devices over a common peripheral device bus, the improvement wherein

A. said peripheral device bus includes first and second input-/output buses for transferring information-representative signals, including at least one of a data, address and con-

trol signal, between said first input/output controller and said peripheral devices,

B. said first input/output controller includes first and second processing sections, each said section being coupled with said first and second input/output buses for communication with said peripheral devices, each of said first and second processing sections being responsive to duplicate signals received substantially synchronously and simultaneously with the other processing section to produce, in the absence of fault, identical resultant information-representative signals synchronously and simultaneously therewith,

C. first bus interface means coupled with said first input/output controller and with said peripheral bus for transferring said information-representative signals between each of said first and second input/output buses and each of said first and second processing sections,

D. a second input/output controller coupled with said peripheral device bus for duplicating at least some of the operations of said first input/output controlling,

E. second bus interface means coupled with second input-/output controller and with said peripheral bus for transferring said information-representative signals between said first and second input/output buses and said second input/output controller,

F. flash circuitry means coupled to said first and second bus interface means for monitoring information-representative signals transferred on said first and second input/output buses and for generating a set of one or more status signals indicative of the synchronous transfer of at least selected identical ones of said information-representative signals on each of said first and second input/output buses, said status signals including one or more timing signals, said flash circuitry means including means for applying said timing signals synchronously and simultaneously to said first and second bus interface means for transfer to said peripheral devices and said input/output controllers, and

G. at least said first input/output controller and said peripheral devices including means for responding to said timing signals for processing information-representative signals transferred to them on said first and second input/output buses.

4,931,923

COMPUTER SYSTEM FOR AUTOMATICALLY RECONFIGURATING MEMORY SPACE TO AVOID OVERLAPS OF MEMORY RESERVED FOR EXPANSION SLOTS

Jonathan Fitch, Cupertino, and Ronald Hochsprung, Saragota, both of Calif., assignors to Apple Computer, Inc., Cupertino, Calif.

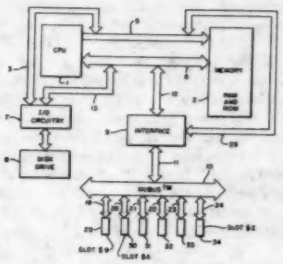
Filed Mar. 13, 1987, Ser. No. 25,499

The portion of the term of this patent subsequent to Feb. 27, 2007, has been disclaimed.

Int. Cl.[5] G06F *9/02, 9/06, 13/00, 13/10*

U.S. Cl. 364—200 **5 Claims**

1. A computer system comprising a main circuit board including a central processing unit and slots each with means for receiving a printed circuit board card, memory coupled to said central processing unit (CPU) to receive addresses of memory locations from said CPU and to provide data to said CPU, said memory being disposed on at least one of said main circuit board and said card, said main circuit board including input-output circuitry coupled to said memory to provide data to said memory and coupled to said CPU to receive control signals from said CPU, said main circuit board having less than 16 slots, said main circuit board including a 32 bit address bus being coupled to said CPU and to said memory to address said memory, said CPU including an address generation means for generating 2^{32} different addresses ranging from location **$0000 0000** to location **$FFFF FFFF**, said location being in hexadecimal notation, each of said slots having a distinct number in said system and being coupled to said bus for addressing said memory, each of said slots being coupled to distinct identification line means on said main circuit board, each of said distinct identification line means providing a distinct, unchanging signal to the slot to which said distinct identification line means is coupled, said distinct signal for a particular slot identifying the distinct number of said particular slot, where said distinct number of a particular slot is (ID), said distinct number resrving 256 megabytes of memory space for each of said slots such that said 256 megabyte memory space beings at location **$(ID)000 0000** and ends at location **$(ID)FFF FFFF**, whereby any card in slot X will have memory space reserved beginning at location **$X000 0000** and ending at location **$XFFF FFFF**, said locations being in hexadecimal notation.



4,931,924

DATA TRANSFER SPEED CONTROL APPARATUS CAPABLE OF VARYING SPEED OF DATA TRANSFER BETWEEN DEVICES HAVING DIFFERENT TRANSFER SPEEDS

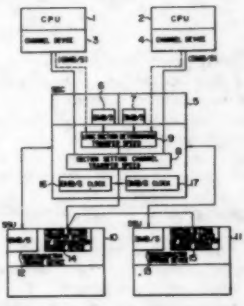
Kenichi Kageura, Fujisawa, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 16, 1987, Ser. No. 133,805

Claims priority, application Japan, Dec. 19, 1986, 61-301817

Int. Cl.[5] G06F *5/06, 3/00*

U.S. Cl. 364—200 **13 Claims**



1. A computer system comprising:

(a) at least one CPU which includes a channel device for transferring data at a speed variable within a predetermined range;

(b) semiconductor storage devices having data transfer speeds variable within a predetermined range, respectively; and

(c) a storage control device connected between said at least one CPU and said semiconductor storage devices for controlling data transfer therebetween;

(d) said storage control device including first indication

means for indicating a maximum data transfer speed of the channel device of said at least one CPU;

(e) each semiconductor storage device of said semiconductor storage devices includes second indication means for indicating a maximum data transfer speed of said each semiconductor storage device; and

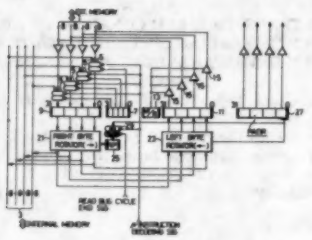
(f) said storage control device further including transfer speed determining and setting means coupled to said first and second indication means and said at least one CPU for responding to a demand of data transfer issued from said at least one CPU to one of said semiconductor storage devices to read the maximum data transfer speed of the channel device of said at least one CPU indicated by said first indication means and the maximum data transfer speed of said one of said semiconductor storage devices indicated by said second indication means and to set a speed of data transfer between the channel device of said at least one CPU and said one of said semiconductor storage devices to the lower of said maximum data transfer speeds based on a comparison between said maximum data transfer speeds.

4,931,925

HIGH SPEED BYTE DATA REARRANGING PROCESSOR

Tohru Utsumi, Yokohama, and Tohru Sasaki, Kawasaki, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jul. 15, 1988, Ser. No. 219,344
Claims priority, application Japan, Jul. 24, 1987, 62-183764
Int. Cl.[5] G06F 7/00
U.S. Cl. 364—200 6 Claims



1. A data processor interfacing system, for use with a data processor, for reciprocally transferring data in an appropriate data order between an internal memory of said data processor and an external memory via an internal bus coupled to said internal memory and an external bus coupled to said external memory, respectively, said system comprising:

first coupling means for coupling said system to said internal bus;

second coupling means for coupling said system to said external bus;

selector means, having an input coupled to both said first coupling means and said second coupling means for receiving internal byte data outputted to said internal bus from said internal memory and for receiving external byte data outputted to said external bus from said external memory, for selecting and providing valid byte data at a selector output;

first storage means coupled to said selector output for storing said valid byte data and providing said valid byte data at an output;

rotating means for receiving said valid byte data from said first storage means and for rotating said valid byte data into said appropriate data order to provide rotated data at a rotating means output;

second storage means having an input;

third coupling means for coupling said rotating means between said output of said first storage means and said input of said second storage means;

said second storage means receiving said rotated data from said rotating means output for storing and outputting said rotated data to said second coupling means; and

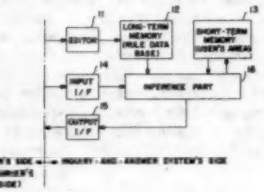
controlling means for providing command signals received from said data processor for determining a rotation amount for said rotating means.

4,931,926

INPUTTING SYSTEM AND AN EDITING SYSTEM IN AN INQUIRY-AND-ANSWER SYSTEM

Toshiyuki Tanaka, Yamatokoriyama; Shigeki Kuga, Nara; Taro Morishita; Nobuo Nakamura, both of Yamatokoriyama, and Mikio Ohaaki, Kashihara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Division of Ser. No. 915,021, Oct. 3, 1986, Pat. No. 4,837,689.
This application Apr. 5, 1989, Ser. No. 333,565
Claims priority, application Japan, Oct. 7, 1985, 60-225188; Oct. 7, 1985, 60-225189
Int. Cl.[5] G06F 15/38
U.S. Cl. 364—419 5 Claims



1. An editing system in an inquiry-and-answer system which generates a first inquiry and analyzes the response comprising:

input means, for inputting a response from an operator to the first inquiry;

inference means, responsive to said input means, for developing information representing the meaning of the response;

said inference means developing inquiries to further determine the meaning of the response;

output means, responsive to said inference means, for outputting inquiries from said inference means to facilitate the determination of the meaning of the response;

said input means inputting responses from the operator to the inquiries from said output means;

short-term memory means, responsive to said inference means, for storing the information developed from the responses and inquiries;

long-term memory means, operatively connected to said inference means, for providing rules to said inference means to facilitate the determination of the meaning of a response;

editor means responsive to said inference means, for transferring the information stored in said short-term memory means representing the meaning of the response to the long-term memory means; and

said output means providing said information from said short-term memory means to said editor means, in response to an operator verification.

4,931,927

METHOD OF CONSTRUCTING AND RECORDING LIST OF RECORDED DATA IN POSTSCRIPT TYPE OPTICAL DISK

Koji Ishiwata, and Satoru Tobita, both of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan

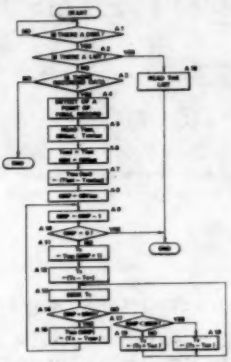
PCT No. PCT/JP86/00152, § 371 Date Jan. 21, 1987, § 102(e) Date Jan. 21, 1987, PCT Pub. No. WO86/05916, PCT Pub. Date Oct. 9, 1986

PCT Filed Mar. 28, 1986, Ser. No. 934,631

Claims priority, application Japan, Mar. 29, 1985, 60-65956

Int. Cl.[5] G06F *3/08, 12/00;* G11B *27/00, 27/10*

U.S. Cl. 364—300 1 Claim



1. In an optical disk recording/reproducing apparatus having means for seeking to a predetermined position on a postscript type optical disk, means for reading recorded data from said disk at said predetermined position, said recorded data comprising at least the data number of a datum recorded on said disk, and means for manifesting time code data corresponding to said predetermined position,

a method of recording a time table, in a memory of said optical disk recording/reproducing apparatus, said time table composed of a list of recorded data stored on said optical disk, comprising the steps of:

detecting a predetermined position on said optical disk corresponding to the ending position of all data recorded on said disk;

reading time code data corresponding to said ending position;

calculating the starting time of the last recorded datum on said disk by subtracting the recording duration time of said last recorded data from the time code data corresponding to the said ending position;

storing said calculated time value in said time table at a position corresponding to the said data number of the last recorded datum on said disk;

initializing a pointer with a value derived from said data number;

reading out the starting time of the data number represented by said pointer from said time table;

storing, in a register, a value equal to said calculated time value reduced by a predetermined offset;

seeking the predetermined location on said disk corresponding to said value stored in said register;

effecting compensation for the said value stored in said register when the data number of a datum recorded on said optical disk at the position corresponding to said stored value does not correspond with the value of said pointer, so as to obtain a stored value corresponding to the position of starting of the recorded datum on said optical disk corresponding to said pointer;

storing said stored value in said time table at a location corresponding to the data number represented by the value of said pointer when the data number coincides with the pointer; and

repeating said seeking operation to obtain the starting time point for each datum recorded on said optical disk so as to complete said list with starting times for all data recorded on said optical disk;

and recording said list in a list area of said optical disk.

4,931,928

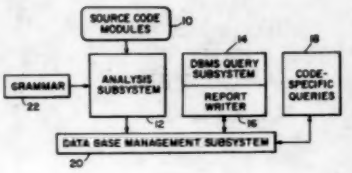
APPARATUS FOR ANALYZING SOURCE CODE

Norton R. Greenfeld, 6 Brook Trail Rd., Wayland, Mass. 01778

Filed Nov. 9, 1988, Ser. No. 269,135

Int. Cl.[5] G06F *9/44*

U.S. Cl. 364—300 19 Claims



1. In a computer system, apparatus for analyzing source code comprising:

an analysis member which extracts programming semantics information from an input source code of a user desired program;

data storage memory supported independently of the analysis member for receiving from the analysis member extracted programming semantics information and for holding said extracted programming semantics information; and

query means enabling a user to request and obtain desired information about the input source code from the data storage memory, the user analyzing the source code from the obtained information.

4,931,929

DESIGN COMPONENT SELECTION COMPUTER WITH SPECIFICATION OF PRODUCT CHARACTERISTICS AND OF COLOR BY MACHINE READABLE DEVICE

Robert E. Sherman, Chevy Chase, Md., assignor to Search & Source, Incorporated, Alexandria, Va.

Continuation of Ser. No. 693,721, Jan. 22, 1985, abandoned, which is a continuation-in-part of Ser. No. 599,703, Apr. 12, 1984, abandoned. This application Aug. 14, 1987, Ser. No. 85,338

Int. Cl.[5] G06F *15/21;* G01J *3/46*

U.S. Cl. 364—401 9 Claims

1. A process of operating a video archieve system for selection and display of design component information with the aid of a digital computer, comprising:

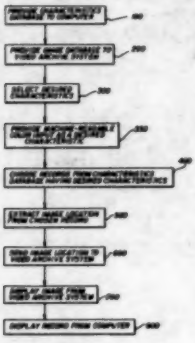
a. providing said video archive system with an optical videodisk image database comprising a plurality of addressable images of design components on at least one side;

b. providing said computer with a characteristics database comprising a plurality of records corresponding to each of said design components, each said record comprising a plurality of characteristic identifiers describing said corresponding design component and including at least characteristic identifiers in categories of price, color, manufacturer and location of an image of said corresponding design component on the optical videodisk;

c. providing said computer with a selection of one or more desired product component characteristics, including color, said color being provided to said computer through machine-readable color input means which indicates said

color as digitized quantities of hue, chroma and value so that each color falls within a predetermined block of color coordinates and means for selection of personal color preference from among a plurality of colors derived from a color module using an order of color dominance, said colors being adapted to be displayed by said video archive system;

d. choosing, in said computer, records from said characteristics database having characteristic identifiers corresponding to said desired component characteristics;



e. extracting from each said chosen product record, in said computer, a location of said design component image corresponding to said chosen record;

f. transferring said location of said image corresponding to said chosen record from said computer to said video archive system, and causing said video archive system to display said image corresponding to said chosen record; and

g. displaying said plurality of characteristic identifiers of said chosen record corresponding to said displayed image of said design component.

4,931,930

AUTOMATIC PARKING DEVICE FOR AUTOMOBILE

Jia-Ming Shyu, and Ching-Wang Chuang, both of Hsin Chu Hsien, Taiwan, assignors to Industrial Technology Research Institute, Hsin Chu Hsien, Taiwan

Filed Apr. 5, 1988, Ser. No. 177,975

Int. Cl.[5] B60S *11/00*; G06F *15/20*

U.S. Cl. 364—424.01 **10 Claims**

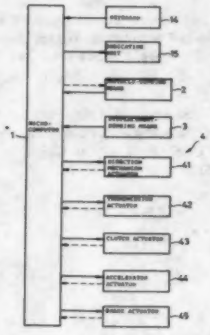
1. A device for assisting a vehicle operator to park a vehicle, comprising:

displacement-sensing means for measuring the moving distance of the car and providing a signal indicative thereof;

obstacle-sensing means including several distance-measuring units mounted at suitable parts of the vehicle and pointing in certain directions for measuring distances between a body of the vehicle and obstacles along those directions, and providing signals indicative thereof;

mode selection means for allowing the vehicle operator to select a desired parking mode from left-side parallel, left-side perpendicular, right-side parallel and right-side perpendicular, and providing a signal indicative thereof; and

a microcomputer for receiving said signals from said displacement-sensing means, said obstacle-sensing means and said mode selection means, for sensing a parking space at one side of the vehicle during forward movement of the vehicle, for calculating parameters needed in executing said parking mode, and for providing instruction signals to display on an indicating unit for informing the operator how to manipulate controls of the vehicle to park it, the instruction signals including signals for a steering operation, a transmission operation, remaining displacement of the vehicle, and parking space conditions.



4,931,931

METHOD AND A SYSTEM FOR PROCESSING LOGIC PROGRAMS

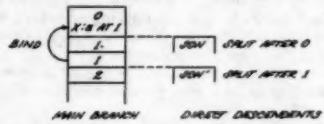
Jean-Claude Syre; Harald Westphal, both of Munich, Fed. Rep. of Germany, and Max Hailperin, Hayward, Calif., assignors to European Computer-Industry Research Centre GmbH, Munich, Fed. Rep. of Germany

Filed Jul. 2, 1987, Ser. No. 70,818

Claims priority, application European Pat. Off., Jul. 8, 1986, 86109342.5

Int. Cl.[5] G06F *9/00*

U.S. Cl. 364—300 **8 Claims**



1. A method of parallel processing a logic program in a computer system, said logic program including a plurality of OR-parallel nodes from which a father process may split off a first son process, said father process having variables commonly accessible by the father and the first son processes, comprising the steps of;

executing said father process until a first OR-parallel node is reached;

determining whether parallel processing of said first son process may occur;

creating a first OR-branch-level label in said father process which identifies said first OR-parallel node;

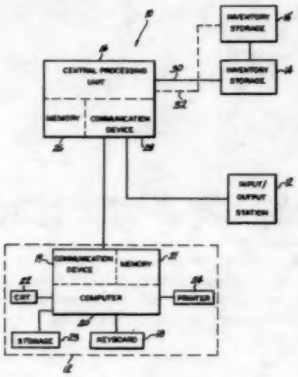
if parallel processing of said first son process may occur, creating a first son hash window in said first son process having bindings to said variables commonly accessible by said father and first son processes said bindings indicating whether each of said variables was set before said first OR-parallel node as identified by said first OR-branch-level label; and

executing said first son process in parallel with said father process using the bound variables in said first hash window.

4,931,932
COMPUTERIZED SYSTEM WITH MEANS TO AUTOMATICALLY CLEAR AND SELL WAIT-LISTED CUSTOMER RESERVATIONS

Stanley Dalsekoff, and Michael L. Schneider, both of New Haven, Conn., assignors to Travelsoft, Inc., New Haven, Conn.

Filed Sep. 28, 1987, Ser. No. 101,973
Int. Cl.[5] G06F *15/26*
U.S. Cl. 364—407 19 Claims



1. A reservation system for use by travel agents which electronically and automatically clears travel requests and which comprises:

means for communicating with a storage device storing an inventory of seats on a particular mode of transportation, said seats being categorized as unavailable if sold or reserved and being categorized as available if unsold or unreserved;

said inventory of seats being changeable as a result of cancellation and non-cancellation events;

said communicating means including means for enabling at least one agent to request a desired seat on a desired mode of transportation by specifying a desired set of criteria;

means for evaluating the seat request to determine the availability of the desired seat and for providing an indication to said at least one agent of a completed transaction if said requested seat is in said available category and of a non-completed transaction if said requested seat is in said unavailable category;

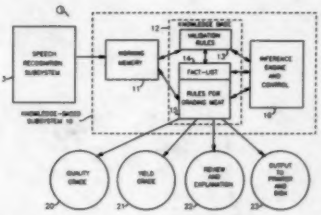
means for compiling and storing a set of wait-listed requests comprising a plurality of said non-completed transactions; and

said communicating means further including means for automatically clearing and selling said wait-listed seat requests without further intervention of said at least one agent by continuously and automatically querying said changeable seat inventory in said storage device about each said wait-listed request and re-evaluating each said wait-listed request until each said wait-listed request is filled.

4,931,933
APPLICATION OF KNOWLEDGE-BASED SYSTEM FOR GRADING MEAT

Yud-Ren Chen, Hastings, and Steven A. Robinson, Oak, both of Nebr., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Feb. 9, 1989, Ser. No. 308,220
Int. Cl.[5] G06F *15/21*
U.S. Cl. 364—409 9 Claims



1. System for grading carcasses comprising:

a. means for establishing an identification for each carcass to be graded;

b. input means for inputting information relating to the characteristics of said carcass to be graded and automatically correlating said information to said identification;

c. a program comprising a knowledge base of facts and rules relating to the grading of carcasses;

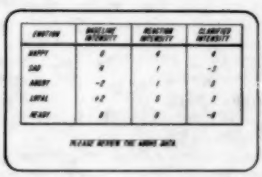
d. an inference engine for comparing said information against the facts and rules of said knowledge base; and

e. means for outputting the results of said grading as related to said carcass.

4,931,934
METHOD AND SYSTEM FOR MEASURING CLARIFIED INTENSITY OF EMOTION

Thomas E. Snyder, 10 Allen Rd., Wellesley, Mass. 02181

Filed Jun. 27, 1988, Ser. No. 211,706
Int. Cl.[5] G09B *19/00*
U.S. Cl. 364—419 12 Claims



1. A method for measuring an emotional response of a subject to a chosen focus comprising the steps of:

determining reaction emotions experienced by the subject when placed in contact with the chosen focus;

determining an intensity level on a standard scale for each of said experienced reaction emotions;

determining a corresponding baseline intensity for each of said reaction emotions experienced by the subject with the subject's attention being directed away from the chosen focus "wherein said baseline intensity represents an accumulatable whole preconcious emotional make-up";

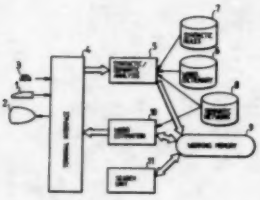
deriving a clarified emotion intensity by subtracting said corresponding baseline intensity from said intensity level.

4,931,935

USER INTERFACE SYSTEM FOR PERMITTING NATURAL LANGUAGE INTERACTION WITH AN INFORMATION RETRIEVAL SYSTEM

Eiji Ohira, Hachioji, and Akio Komatsu, Kodaira, both of Japan, assignors to Hitachi Ltd., Tokyo, Japan

Filed Jul. 1, 1988, Ser. No. 214,483
Claims priority, application Japan, Jul. 3, 1987, 62-165326
Int. Cl.[5] G06F *15/38*
U.S. Cl. 364—419 **4 Claims**



1. In a variety of systems for information retrieval where natural language is inputted by inputting means, a user interface system for information retrieval, comprising:

means for sequentially effecting syntactic and semantic analysis, every time a retrieval request sentence is inputted, on words and clauses of said retrieval request sentence;

means for creating partial syntactical and semantic expressions from successively obtained results of said syntactic and semantic analysis;

means for predicting words or clauses which are to be next inputted as said retrieval request sentence by making use of a semantic relation between a syntactic and semantic expression and an associated task;

means for displaying candidates for said predicted words or clauses; and

means for taking in selected words or clauses as subsequent words or clauses of said retrieval request sentence and permitting a user to select at least one of said displayed candidates.

4,931,936

LANGUAGE TRANSLATION SYSTEM WITH MEANS TO DISTINGUISH BETWEEN PHRASES AND SENTENCE AND NUMBER DISCRMINATING MEANS

Shuzo Kugimiya; Yoji Fukumochi; Ichiko Nakamura, all of Nara; Tokuyuki Hirai, Yamatokoriyama, and Hitoshi Suzuki, Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Oct. 25, 1988, Ser. No. 262,314
Claims priority, application Japan, Oct. 26, 1987, 62-271286; Dec. 23, 1987, 62-326391
Int. Cl.[5] C06F *15/38*
U.S. Cl. 364—419 **4 Claims**

1. A machine translation apparatus comprising:

a morpheme analyzer having a dictionary for analyzing a source sentence into morphemes and for obtaining part of speech and other information using said dictionary;

a syntax analyzer having grammatical rules for analyzing the structure of the morphemes identified by said morpheme analyzer using said dictionary and grammatical rules;

a convertor for converting the structure obtained by said syntax analyzer to a structure of the target language;

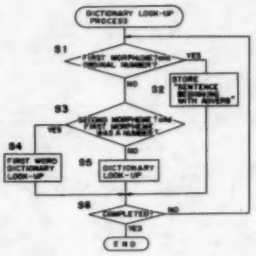
a translated sentence generator for generating a translated sentence according to the structure of the target language obtained by said convertor;

a number discrimination means which distinguishes whether or not the first morpheme to appear in the sentence separated by said morpheme analyzer is a number; and

a memory control means which, when said number discrimination means identifies the morpheme at the beginning to be a number, stores data which identifies said number as a sentence beginning adverb so that said number is added to the beginning of said translated sentence converted to the target language.

2. A machine translation apparatus as claimed in claim 1, further comprising:

a majuscule discrimination means which distinguishes whether or not the first letter of the input morpheme is a majuscule;



a storage means which stores words for which the first letter was distinguished to be a majuscule by said majuscule discrimination means; and

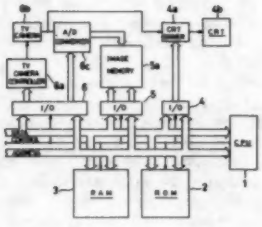
a heading specifying means which specifies the words stored in said storage means to be a heading if a word continuing after the word stored in said storage means is a last word and is other than a period, a question mark and an exclamation mark.

4,931,937

DISTANCE DETECTOR MOUNTED ON VEHICLE

Toshiaki Kakinami, Kawasaki, and Shigemitsu Hamajima, Obu, both of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Aichi, Japan

Filed Sep. 1, 1988, Ser. No. 239,254
Claims priority, application Japan, Sep. 1, 1987, 62-218935
Int. Cl.[5] G06F *15/50*
U.S. Cl. 364—424.01 **5 Claims**



1. A distance detection means mounted on a vehicle for detecting an obstacle and for detecting a distance to the obstacle, the distance detection means comprising:

original information generating means for generating original image information corresponding to at least part of a scene in a set detection direction;

supervision area setting means for setting a supervision area which specifies at least part of said original image information;

first feature extraction area setting means which successively renews, and which sets a search area at least part of which is included in said supervision area, the search area corre-

sponding to an area having image information of the obstacle, said first feature extraction area setting means setting a first feature extraction area based on said search area when a correlation of optical feature components of said original image information in said search area and an occupation area satisfies set conditions, said optical feature components of said original image information corresponding to the obstacle;

first edge extraction means for extracting edges in an area in which the optical feature components of the original image information in said first feature extraction area present a sudden change relative to surrounding optical feature components in a first direction;

second feature extraction area setting means for setting a second feature extraction area based on edges extracted by said first edge extracting means, said second feature extraction area corresponding to a width of the obstacle;

second edge extraction means for extracting edges in an area in which the optical feature components of the original image information in said second feature extraction area present a sudden change relative to surrounding optical feature components in a second direction which is different from said first direction; and

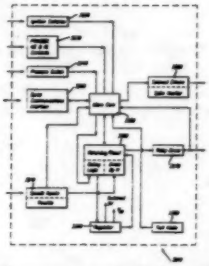
distance detection means for detecting the obstacle when an edge extracted by said second edge extraction means exhibit specified features, and for detecting the distance to said obstacle based on the spatial information of said extracted edge.

4,931,938

MICROCOMPUTER CONTROLLED FAUCET

David Hass, 126 Second St., Troy, N.Y. 12180

Filed Mar. 7, 1986, Ser. No. 837,500
Int. Cl.[5] G05D *23/00*
U.S. Cl. 364—152 **8 Claims**



1. A faucet with computer controlled temperataure comprising:

a hot fluid supply connection, for supplying hot fluid to said faucet;

a cold fluid supply connection, for supplying cold fluid to said faucet;

hot and cold fluid valves connected, respectively, to said hot and cold fluid supply connections, said hot and cold valves each having a valve seat and a valve member movable with respect to said valve seat to control a flow of fluid through said valve, with each said valve member being further disposed so that one of its ends is threaded and so that the opposite end thereof has attached thereto a seal which is engageable with said associated valve seat;

first and second stepper motors connected, respectively, to said hot and cold fluid valves for moving said hot and cold valve members, respectively, in relationship to their associated valve seats, said stepper motors eadch having a shaft and a threaded connection fixed to said shaft, each stepper motor shaft having a knob connected thereto for manual rotation of said shaft, and said threaded connection being disposed in threaded engagement with said threaded end of said valve member;

a mixing connection connected between said hot and cold fluid valves, for receiving the flow of hot and cold fluids and mixing them together and discharging them as a mixed flow of fluid;

a temperature sensor connected to said mixing connection for generating an analog signal corresponding to to the actual temperature of the mixed fluid;

analog-to-digital conversion means connected to said temperature sensor for converting said analog signal into a digital temperature signal corresponding to the actual temperature of the mixed fluid;

a microcomputer connected to said conversecion means for computing an error value between the actual temperature and a selected temperature and for applying a digitally implemented feedback control algorithm to said error value to generate a feedback control signal for controlling the fluid flow through said hot and cold valves; and

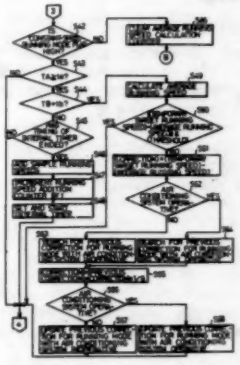
logic means connected to said microcomputer and also to said first and second stepper motors, for receiving said control signal and for controlling said stepper motors in response to said control signal, to move said hot and cold valve members so as to cause the actual temperature of the mixed fluid to approach the selected temperature therefor.

4,931,939

CONSTANT-SPEED RUNNING CONTROLLER

Shoji Kawata, Okazaki; Osamu Miyake, Nishikamo; Nobuyasu Suzumura, Toyota, and Motohide Takeuchi, Tokoname, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Aichi, Japan

Filed Mar. 21, 1988, Ser. No. 171,338
Claims priority, application Japan, Mar. 20, 1987, 62-67265
Int. Cl.[5] B60K *31/04*
U.S. Cl. 364—426.04 **11 Claims**



1. A constant-speed running controller comprising:

accelerating means for accelerating a vehicle;

running speed detecting means for detecting a present running speed;

target running speed setting means for setting up a target running speed; and

control means for controlling said accelerating means in accordance with a speed difference between said present running speed and said target running speed;

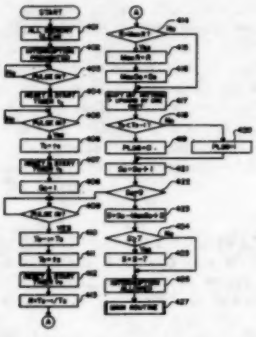
wherein said control means calculates an average running speed measured in a predetermined constant period after setting up said target running speed and the controlling of said accelerating means with said speed difference, calculates a correction being a difference between said target running speed and said average running speed and controls said accelerating means in accordance with said correction, to reduce said speed difference.

4,931,940

ROTATIONAL POSITION DETECTOR FOR CONTROLLING AN INTERNAL COMBUSTION ENGINE

Sumitaka Ogawa, Oomiya, and Tatsuo Hayashi, Tokyo, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 2, 1988, Ser. No. 201,433
Claims priority, application Japan, Jun. 5, 1987, 62-139694; Aug. 25, 1987, 62-211046; Oct. 21, 1987, 62-267319
Int. Cl.[5] G01M 15/00; F02P 5/145; G06F 15/20
U.S. Cl. 364—431.03 8 Claims



1. A rotational position detector for controlling an internal combustion engine comprising:

a rotary body rotatable in synchronism with internal combustion engine operation;

a plurality of detectable portions disposed on said rotary body;

pulse generating means operatively positioned adjacent to said rotary body for generating a pulse output each time one of said detectable portions on said rotary body passes said pulse generating means;

measuring means for measuring time intervals between respective pulses, a preceding pulse and a present pulse, and developing an output;

an increase/decrease discriminator adapted to compare previous and present values of the output of said measuring means to check for an increase or decrease therein as compared with a predetermined value and developing an output; and

memory means for storing the output of said increase/decrease discriminator for a predetermined period in an increase/decrease pattern and developing an output for controlling the operation of said internal combustion engine;

wherein the increase/decrease discriminating pattern comprises an increase/decrease time length discriminator and pattern checking means for checking malfunction of the pattern showing increase/decrease sequence of time distance between each inputted pulse.

4,931,941

ADAPTIVE ROUTING OF NETWORK TRAFFIC

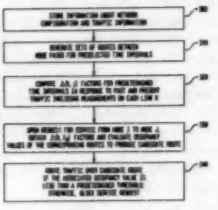
Komandur R. Krishnan, Bridgewater Township, Somerset County, N.J., assignor to Bell Communications Research, Inc., Livingston, N.J.

Filed Jul. 25, 1988, Ser. No. 223,412
The portion of the term of this patent subsequent to Nov. 29, 2005, has been disclaimed.
Int. Cl.[5] H04M 3/36, 7/06
U.S. Cl. 364—437 8 Claims

1. A method for routing offered traffic through a network composed of a plurality of nodes interconnected by links according to a preselected pattern, wherein each node is arranged to communicate with the other nodes, said method comprising the steps of

generating, for use at preselected intervals, sets of routes, each route composed of at least one link and each set including at least one route between each node pair,

over predetermined periods, measuring link data to estimate an equivalent offered load for each link, said equivalent offered load for each link being given by the ratio $\phi/(1-\alpha)$, where ϕ is the carried load and α is the blocking, as obtained from measured link data, and computing



route occupancy factors based on said equivalent offered load,

upon a request for service between a particular node pair, computing occupancy values from said occupancy factors in relation to the current usage of the links comprising the routes in the set associated with the node pair, and

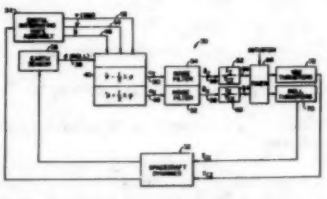
if the minimum of the occupancy value is less than a preselected threshold, routing the request over the route having the minimum value; otherwise, blocking the service request.

4,931,942

TRANSITION CONTROL SYSTEM FOR SPACECRAFT ATTITUDE CONTROL

Subhash C. Garg, San Jose, Calif., and Bruce D. Gretz, Philadelphia, Pa., assignors to Ford Aerospace Corporation, Newport Beach, Calif.

Filed May 26, 1988, Ser. No. 198,942
Int. Cl.[5] B64G 1/38
U.S. Cl. 364—459 11 Claims



10. In a three-axis stabilized spacecraft employing an internal body-fixed momentum wheel as an attitude stabilization means and characterized by a nutation period, an apparatus for controlling transition from thruster control to momentum wheel control to minimize nutation angle and transition time, said apparatus comprising:

sensor means for obtaining values representative of spacecraft roll angle, spacecraft yaw angle, spacecraft roll rate and spacecraft yaw rate; and

means coupled to said sensor means for controlling firing of spacecraft roll and yaw attitude control thrusters at intervals of substantially one-half of said nutation period, including

means for calculating a spacecraft transverse angular momentum vector at intervals of one-half of said nuta-

tion period from spacecraft moments of inertia and said values representative of spacecraft roll angle, spacecraft yaw angle, spacecraft roll rate and spacecraft yaw rate, said transverse angular momentum vector comprising a roll component and a yaw component,

means for computing from said values representative of spacecraft roll angle, spacecraft yaw angle, spacecraft roll rate and spacecraft yaw rate a firing duration for said attitude control thrusters for causing spacecraft motion following thruster firing to reduce nutation amplitude toward a transverse angular momentum of zero,

means for causing firing of said roll and yaw attitude control thrusters according to said firing duration, and

timing means for sequencing firing of said roll and yaw attitude control thrusters at intervals of substantially one-half of said nutation period of spacecraft.

4,931,943

FRANKING MACHINE PROVIDING A PERIODIC HISTORICAL TRAIL

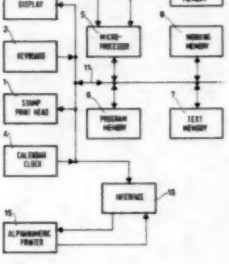
Bernard Vermesse, L'Hay les Roses, France, assignor to Societe Anonyme dite : SMH Alcatel, Paris, France

Filed Mar. 29, 1988, Ser. No. 174,755

Claims priority, application France, Mar. 31, 1987, 87 04479

Int. Cl.[5] G07B *17/00*

U.S. Cl. 364—464.02 **20 Claims**



1. A franking machine providing a historical trail, the machine comprising a microprocessor, and connected to said microprocessor: a stamp print head; a keyboard; a calendar clock; a control memory; a working memory; at least one first nonvolatile memory referred to as the machine state memory for recording the state of the machine meters corresponding to the last franking operation performed; and a second nonvolatile memory referred to as the trail memory, having at least a first memory space organized as a plurality of identical compartments which are individually addressable by first updating control means for writing in said first memory space, said updating means being triggered at time intervals specific to said first memory space for recording data relating to the machine state at the instants concerned in the various compartments thereof, said machine further including:

second control means for consulting each first memory space, said second control means controlling the addressing of the compartments thereof in order to read the trail recorded in the "consulted" compartment, i.e. in that one of the compartments which is being addressed; and

said second control means including a text memory belonging to said control memory and containing firstly a first message which is accessible by means of a menu key on said keyboard and which defines a sequence of special operations for the machine, said operations being split into a sequence of first screens capable of being displayed on at least one line comprising a plurality of alphanumeric characters on an alphanumeric display connected to the microprocessor, with at least one of said first screens corresponding to a machine state trail consultation operation which may be selected by means of a digit key of said keyboard for designating said operation, and also containing, for use during trail consultation, a second message constituted by a sequence of second screens successively displayable on the display when the consultation operation has been selected, with some of said second screens displaying the trail recorded in the consulted compartment, with other screens defining proposals for changing the compartment being consulted, and with each of said proposals being selectable by means of a corresponding key designated together with the proposal concerned when the proposal is displayed.

4,931,944

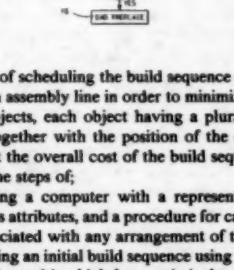
METHOD OF OPTIMIZING A VEHICLE ASSEMBLY LINE BUILD SEQUENCE

Roy Richter, Ann Arbor; Jackson G. Gay, Birmingham, and Robert A. Kromer, Royal Oak, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Continuation of Ser. No. 199,696, May 27, 1988, abandoned. This application Nov. 8, 1989, Ser. No. 434,536

Int. Cl.[5] G06F *15/00*

U.S. Cl. 364—468 **5 Claims**


START PROCEDURE
CURRENT PLACE IS FIRST POSITION CURRENT COLOR IS FIRST COLOR
CURRENT OBJECT IS FIRST OBJECT
CURRENT OBJECT HAVE CURRENT COLOR
YES
PLACE CURRENT OBJECT AT CURRENT POSITION INCREMENT CURRENT POSITION
HAVE NEXT OBJECT THE CURRENT OBJECT
IS CURRENT OBJECT THE LAST OBJECT
YES
HAVE NEXT COLOR THE CURRENT COLOR
CURRENT POSITION AFTER END OF SEQUENCE
YES
END PROCEDURE

1. A method of scheduling the build sequence of a plurality of objects on an assembly line in order to minimize the cost of building the objects, each object having a plurality of attributes, which together with the position of the object in the sequence, affect the overall cost of the build sequence:

comprising the steps of;

(a) providing a computer with a representation of the object, its attributes, and a procedure for calculating the cost associated with any arrangement of the attributes,

(b) generating an initial build sequence using the representation of step (a) which has a miminal cost associated with the arrangement of at least one of said attributes,

(c) generating a final build sequence in accordance with a simulated annealing algorithm which utilizes a scoring function that includes the costs defined by the procedure of step (a), those costs associated with the attributes of step (b) being independently weighted in accordance with a temperature varying function,

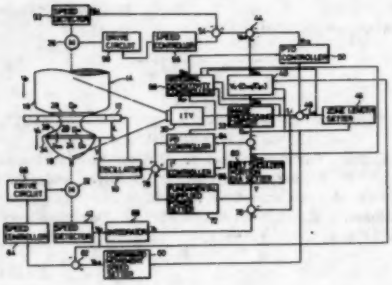
(d) providing a representation of the final build sequence usable for construction of the objects.

4,931,945

METHOD OF CONTROLLING FLOATING ZONE

Kenichi Taguchi, Joetsu, and Masataka Watanabe, Nigata, both of Japan, assignors to Shin-Etsu Handotai Company Limited, Tokyo, Japan

Filed Dec. 5, 1988, Ser. No. 280,695
Claims priority, application Japan, Dec. 5, 1987, 62-308277
Int. Cl.[5] H05B 5/00, 5/08
U.S. Cl. 364—477 10 Claims



1. A method of controlling a floating zone, comprising the steps of: supplying a high frequency current to an induction heating coil (12) to form a melt from a raw-material rod (16) from one side thereof so that a crystal rod (18) crystallizes and grows from said melt; axially moving said raw-meterial rod toward the melting side and said crystal rod in the direction opposite to the melting side relative to said induction heating coil; imaging, with an imaging device (30), a floating zone (20) having a thin portion and formed between said rods; measuring geometric quantities of said floating zone from the image obtained by said imaging device; and controlling the electric power (P) supplied to said induction heating coil and the speed (V_p) at which said raw-material rod is moved relative to said induction heating coil so that said geometric quantities become equal to desired values, said method being characterized in that

said geometric values include one Z_l of the axial length of said floating zone, the distance (L) between said induction heating coil and a crystallization boundary (24) and the diameter (D_n) of a melt neck portion located on the side of said crystallization boundary at a predetermined distance from said induction heating coil, and one D_l of the diameter (D_s) of said crystallization boundary and the diameter (D_m) of a melt shoulder portion (34) located between said crystallization boundary and said thin portion at a predetermined distance (h_m) from said crystallization boundary, and that

if a desired value of said Z_l is Z_o, a desired value of said D_l is D_o and $M=(Z_l-Z_o)(D_l-D_o)$,

the contribution of control of said relative speed (V_p) is smaller when $Z_l=Z_o$ and $D_l=D_o$ are not satisfied substantially and $M>0$ than it is when $Z_l=Z_o$ and $D_l=D_o$ are satisfied substantially (104, 106), and

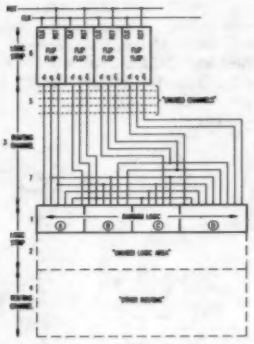
the contribution of control of said electric power (P) is smaller when $Z_l=Z_o$ and $D_l=D_o$ are not satisfied substantially and $M<0$ than it is when $Z_l=Z_o$ and $D_l=D_o$ are satisfied substantially (112, 122).

4,931,946

PROGRAMMABLE TILES

H. Ravindra, Milpitas; Suhas S. Patil, Cupertino; Ernest S. Lin, Sunnyvale; Mahmud M. Assar, Morgan Hill, and Dayakar Reddy, Milpitas, all of Calif., assignors to Cirrus Logic, Inc., Milpitas, Calif.

Filed Mar. 10, 1988, Ser. No. 166,596
Int. Cl.[5] G06F 15/60; H01L 27/00
U.S. Cl. 364—490 25 Claims



1. An integrated circuit comprising:

a laterally-extending substrate on which there is defined an elongated function area composed of at least three tile areas joined one to the next, a first and second of the tile areas being structured as terminating tile areas of the elongated function area and a third of the tile areas being differently structured as a middle tile area interposed between the terminating tile areas;

wherein each of the tile areas is of substantially the same size so that a tiled plurality of such tile areas may define a grid;

wherein each tile area includes within its boundaries P and N field effect transistors having source and drain portions defined in a diffusion layer of the substrate and gate portions defined by a gate layer overlying the diffusion layer, the gate portions of the P and N transistors being joined to one another by a common segment of the gate layer;

wherein each tile area further includes an input wire piece extending in a first lateral direction above the gate layer, the input wire piece connecting by way of a contact to a central portion of the common gate layer segment and other portions of the common gate layer segment defining the gate portions of the P and N transistors; and

wherein each tile area also includes an output wire piece extending in a second lateral direction different from the first lateral direction, the output wire piece passing insula-

tively by the input wire piece of its respective tile area, the output wire piece being positioned to contact to at least the drain portion of one of the P and N transistors in its respective tile area.

4,931,947

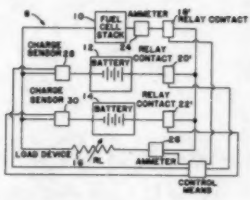
FUEL CELL/BATTERY HYBRID SYSTEM HAVING BATTERY CHARGE-LEVEL CONTROL

John Werth, Princeton, and Imre Fekete, deceased, late of Piscataway, all of N.J. (by Anna M. Fekete, administratrix), assignors to Engelhard Corporation, Edison, N.J.

Continuation of Ser. No. 191,718, Mar. 2, 1988, abandoned, which is a continuation of Ser. No. 48,996, May 5, 1987, abandoned, which is a continuation of Ser. No. 894,474, Aug. 4, 1986, abandoned, which is a continuation of Ser. No. 537,460, Sep. 29, 1983, abandoned. This application Feb. 16, 1989, Ser. No. 312,327

Int. Cl.[5] H02J 7/00

U.S. Cl. 364—492 7 Claims



1. A hybrid power source system for supplying electrical current to a load and for controlling the amount of current supplied in response to current demand from the load, the power source comprising:

a primary electrical energy source couplable to the load through a first switch means interposed therebetween and having a predetermined maximum desired power output;

first energy storage means couplable to the load in parallel with the primary electrical power source through a second switch means interposed between the first energy storage means and the load;

second energy storage means couplable to the load in parallel with both the primary electrical power source and the first energy storage means through a third switch means interposed between the second energy storage means and the load, either said primary electrical energy source, said first and second energy storage means or combinations thereof being connected in parallel to supply current to the load depending upon whether said first, said second or said third switch means or combinations thereof are appropriately energized;

load current sensing means for sensing the current flowing into the load;

charge sensor means for sensing the state of charge in said first and second energy storage means and operatively associated with said control means for enabling selection by said control means among said first and second energy storage means of the energy storage means with the highest level of charge, to serve as a surge energy storage means;

and

control means responsive to said load current sensing means for selectively energizing either said first, said second or said third switch means in a manner such that the current demand on said primary electrical energy source is maintained at or below approximately its predetermined maximum desired power output level.

4,931,948

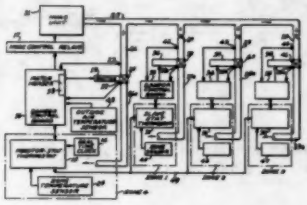
METHOD AND SYSTEM FOR CONTROLLING A SINGLE ZONE HVAC SUPPLYING MULTIPLE ZONES

Jeffrey L. Parker, and Edward Parker, both of Jacksonville, Fla., assignors to Parker Electronics, Inc., Jacksonville, Fla.

Filed Feb. 12, 1987, Ser. No. 13,870

Int. Cl.[5] F25B 29/00; G06F 15/20

U.S. Cl. 364—505 92 Claims



1. A method for controlling the positioning of a plurality of dampers of zone duct damper means prior to activating a single zone HVAC unit that supplies heated or cooled conditioned air through a single duct system having duct damper means and ducts to a plurality of zones and zone thermostats associated with respective dampers, said method comprising the steps of:

A. determining the demand for heating or cooling from all zone thermostats;

B. determining the number of zones having a demand for heating or cooling from all zone thermostats;

C. selectively preselecting the number of zones having demand for heating or cooling that is necessary to select the heating or cooling mode;

D. comparing the numbers obtained from steps B and C and selecting the heating or cooling mode when the number of zones having a demand for heating or cooling respectively is equal to or greater than the number selected in step C;

E. activating appropriate dampers to closed position if the zone thermostats controlling such appropriate dampers have no demand or demand a mode different than the mode selected in step D, and positioning open the other dampers;

F. activating the HVAC unit in the selected mode until all zone thermostats demanding the selected mode have been satisfied;

G. deactivating the HVAC unit; and

H. repeating steps A–G for the other mode when demand for the other mode has been selected in accord with steps A–D.

4,931,949

METHOD AND APPARATUS FOR DETECTING GEAR DEFECTS

Walter C. Hernandez, Potomac; Edward A. Page, Kensington, and Kenneth A. Lefler, Catonsville, all of Md., assignors to Monitoring Technology Corporation, Falls Church, Va.

Filed Mar. 21, 1988, Ser. No. 171,853

Int. Cl.[5] G06F 15/20; G01M 7/00, 13/00

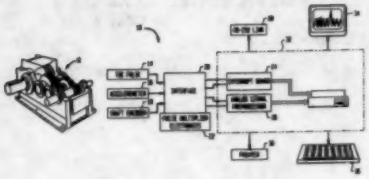
U.S. Cl. 364—497 11 Claims

1. A method for analyzing a gear system having at least two inter-meshing gears, comprising the steps of:

sensing data signals produced by tooth-to-tooth contact in said gear system as said gears revolve, wherein at least some of said data is sensed by shaft encoders and wherein said data signals include signals from at least two top-dead-center pickup means for determining the unique angular orientation of each gear of said gear system;

acquiring additional data from said system, including the number of teeth on each gear, the gear system configuration, and the given machine operating state;

identifying from the combined data, which includes the additional data and the data signals, the relative angular orientation of the gears in said system and the data generated at said orientation; and



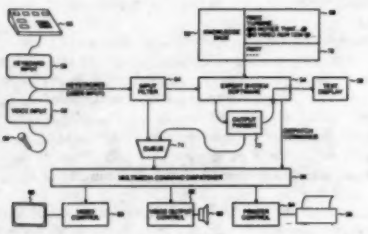
analyzing the combined data to compute gear system vibrational characteristics.

4,931,950

MULTIMEDIA INTERFACE AND METHOD FOR COMPUTER SYSTEM

Brian A. Isle, Isanti; Charles P. Bloom, Eagan; Arch W. Butler, Minneapolis, and David Spoor, Eden Prarie, all of Minn., assignors to Electric Power Research Institute, Palo Alto, Calif.

Filed Jul. 25, 1988, Ser. No. 223,499
Int. Cl.[5] G06F *15/46, 11/30*
U.S. Cl. 364—513 **35 Claims**



1. In a computer system, a multimedia interface comprising:

input means for entering user commands;

multimedia output means for presenting information to the user of said system using a plurality of output media; said multimedia output means including text displaying means for displaying text strings, and at least one additional output media;

an application program coupled to said input means and multimedia output means, said application program including means for generating output strings, said output strings including text strings for immediate delivery to a user of said computer system via said text display means, a multiplicity of said output strings further including means for denoting multimedia commands denoting information that can be presented by said multimedia output means;

queue means for receiving and storing said multimedia commands; and

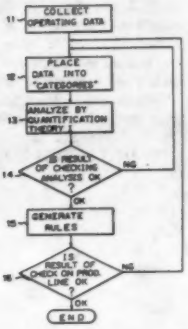
dispatch means coupled to said queue means for executing said multimedia commands stored in said queue means by delivering said multimedia commands to said multimedia output means and thereby presenting said information denoted by said multimedia commands via said multimedia output means.

4,931,951

METHOD FOR GENERATING RULES FOR AN EXPERT SYSTEM FOR USE IN CONTROLLING A PLANT

Ryuichi Murai, and Kenzo Kobayashi, both of Kamakura, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed May 4, 1988, Ser. No. 190,060
Claims priority, application Japan, May 8, 1987, 62-111864; May 8, 1987, 62-111865; Oct. 15, 1987, 62-260408
Int. Cl.[5] G06F *15/18*
U.S. Cl. 364—513 **13 Claims**



1. A method of generating a rule for an expert system for use in controlling the operation of a plant, which comprises the steps of:

analyzing actual operating data manipulated by an operator in a plant by means of Quantification Theory I to produce numerical results; and

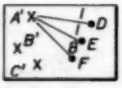
converting the numerical results of the analysis into a rule for an expert system for use in controlling the operation of said plant.

4,931,952

TARGET ASSOCIATION METHOD

Jerry D. Hyder, Norco, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Apr. 4, 1988, Ser. No. 177,258
Int. Cl.[5] G06G *7/78*
U.S. Cl. 364—517 **5 Claims**



1. An improved target association method including the steps of:

(a) generating electrical or optical signals representing target detections from an image sensor;

(b) storing said signals from a first detection interval in a first memory as a first frame of data;

(c) storing said signals from a second detection interval in a second memory as a second frame of data;

(d) generating a matrix of cost functions having n rows corresponding to n targets from said first frame of data and m columns corresponding to m targets in said second frame of data, each cost function being a function of one of n targets in a first frame of data and one of m targets in a second frame of data;

(e) ordering the rows of said matrix by:

(i) computing for each row a value equal to the difference between the two smallest cost functions in the row;

(ii) identifying and selecting as an initial starting row, the row with the largest difference value, and removing from consideration for the calculation of difference values for subsequent rows, the column in which the smallest cost function in said row is located;

(iii) setting said selected row as the first row in said order;

(iv) calculating the difference values for subsequent rows;

(v) setting as the next row in said order the row providing the largest difference value of the remaining rows, if the row has a difference value larger than that of any previously selected row, then recomputing the difference values for the previously selected rows removing from consideration for the calculation of said difference values the column in which the smallest cost function in the currently selected row is located;

(vi) ordering the selected rows according to difference values;

(vii) repeating steps (iv) through (vi) beginning with the last selected row, if the selected row is the last row, then

(f) associating, for each row in accordance with said order of said rows, said signal from the target corresponding to the row with said signal from the target corresponding to the column, not previously associated, having the smallest cost function so that each signal corresponding to each target from said first frame of data is optimally associated with a signal corresponding to a single target in said second frame of data.

4,931,953

CHARACTER PATTERN GENERATION METHOD AND SYSTEM THEREFOR

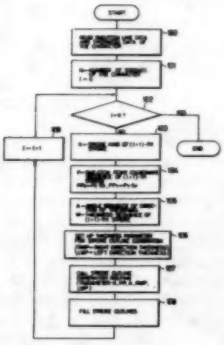
Tetsuzou Uehara; Motohide Kokunishi, both of Tokyo; Kenji Shimoi, Tokorozawa, and Hideko Kagimasa, Hachiouji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Apr. 26, 1988, Ser. No. 186,381

Claims priority, application Japan, Apr. 30, 1987, 63-104246

Int. Cl.[5] G06F *15/40*

U.S. Cl. 364—518 **12 Claims**



1. A character pattern generation method in a character pattern generation system having means for storing skeleton line data and segments of stroke thickness data representative of a character comprising the steps of:

reading out a coordinate value in a coordinate sequence of skeleton points from the skeleton line data previously stored in the means for holding skeleton line data;

reading out the thickness data of the segment of stroke defined by said coordinate value and its subsequent skeleton point in said coordinate sequence, said thickness data being previously stored in connection with the viewing direction of each of said skeleton points to the respective subsequent skeleton point;

obtaining a basic reference of said segment of stroke in accordance with at least a group of characters to which said segment of stroke pertains with said basic reference containing at least an upper limit and a lower limit common to a plurality of characters; and,

thickening said segment of stroke, in accordance with said thickness data and said basic reference.

4,931,954

IMAGE STORAGE SYSTEM AND METHOD OF STORING IMAGES SUCH THAT THEY ARE DISPLAYED WITH GRADUALLY INCREASING RESOLUTION

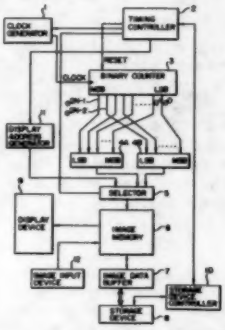
Michitaka Honda, and Takehiro Ema, both of Tochigi, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jun. 29, 1987, Ser. No. 67,246

Claims priority, application Japan, Jun. 30, 1986, 61-151655; Jul. 4, 1986, 61-156119

Int. Cl.[5] G06F *3/14*

U.S. Cl. 364—518 **14 Claims**



11. An image storage system, comprising:

means for receiving information indicative of an image of $2^N \times 2^N$ pixels;

address generating means, for:

(1) setting an initial value of n as a value less than N;

(2) determining a division of a frame of said image, by dividing by 2^n in horizontal and vertical directions;

(3) determining representative pixels in each said division;

(4) determining if any of said representative pixels for said each division are the same pixels as representative pixels for a different division which has already been determined;

(5) generating addresses of said representative pixels other than said same representative pixels; and

(6) determining if $n < N$ and incrementing n and repeating said functions (2)–(6) if so, to thereby sequentially divide said image by $2^{(initial\ value\ of\ n)}$ to 2^N; and

storage means for sequentially storing said representative pixels as addresses thereof are generated by said address generating means.

4,931,955

INK JET PRINTING APPARATUS WITH PREPRINTING JET PURGING MECHANISM

Mitsumasa Okabayashi, and Narao Ito, both of Tokyo, Japan, assignors to Juki Corporation, Chofu, Japan

Filed Apr. 28, 1988, Ser. No. 187,389

Claims priority, application Japan, Apr. 28, 1987, 62-105351; Apr. 28, 1987, 62-105354

Int. Cl.[5] G01D *5/46*; B41J *2/165*

U.S. Cl. 64—519 **5 Claims**

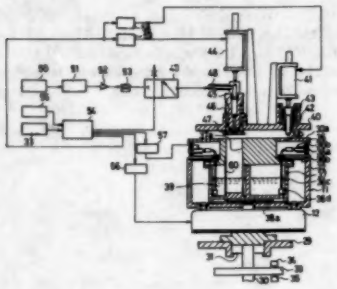
4. An ink jet printing apparatus, comprising:

(a) an ink jet means having a jetting element for jetting ink

from an orifice, said jetting element being movable for printing within a movable range;

(b) gutter means positioned within the movable range of the ink jet means and partially surrounding the ink jet means;

(c) detecting means for detecting that the jetting element is positioned towards the gutter means;



(d) first means for detecting a signal to start printing; and

(e) driving means for energizing the jetting element when a detect signal from said detecting means is generated in association with said first means,

(f) wherein said ink jet means is characterized by conducting rotary motion around a fixed shaft.

4,931,956

VIDEO IMAGE CREATION SYSTEMS

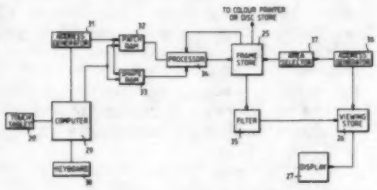
Alan L. Stapleton, Newbury, Great Britain, assignor to Quantel Limited, Newbury, United Kingdom

Filed Apr. 11, 1986, Ser. No. 851,125

Claims priority, application United Kingdom, Apr. 13, 1985, 8509536; Jun. 1, 1985, 8513874

Int. Cl.[5] H04N *1/22*; G09G *1/16*

U.S. Cl. 364—521 **20 Claims**



1. A video image creation system comprising:

operator controlled means for designating points in an image being created;

processing means responsive to said operator controlled means for producing high definition signals representing picture points in said image;

storage means for storing said high definition signals representing picture points in said image;

said storage means comprising sufficient storage locations to store signals representing the image at full resolution;

monitor means;

a viewing store for storing images with a reduced number of picture points compared with the image stored in said storage means;

means for addressing said viewing store to provide a video signal to said monitor means; and

means for selectively updating said viewing store by deriving a reduced number of signals from said storage means in real time relative to designation of points by said operator controlled means.

4,931,957

IMAGE INFORMATION PROCESSING APPARATUS

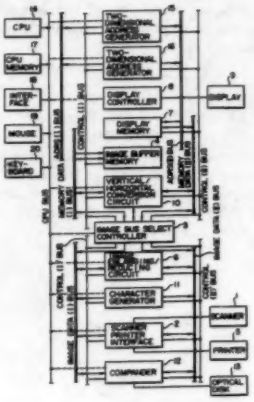
Shiro Takagi, Yokohama, and Minoru Sato, Tachikawa, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Filed Jan. 11, 1988, Ser. No. 141,770

Claims priority, application Japan, Jan. 12, 1987, 62-4743

Int. Cl.[5] G09G *3/06*; G06F *15/20*

U.S. Cl. 364—521 **11 Claims**



1. An image information processing apparatus comprising:

selecting means for sequentially manually selecting at least two image processing commands from among a plurality of image processing commands including a scanning command, a display command and a file command;

scanning means for inputting image information from an original image only in response to sequential selection of the scanning command and at least one of the display command and the file command in the selecting means;

optical memory means for storing the image information input by the scanning means only in response to sequential selection in the selecting means of the scanning command followed by at least one of the file command a sequential combination of the display command and the file command;

display means, including a display screen having at least two display areas, for displaying the image information from one of the scanning means and the optical memory means in response to one of sequential selection of the scanning command and the display command and sequential selection of the file command and the display command, respectively; and

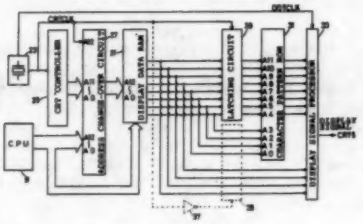
designation means for manually designating the one of at least two display areas to display the image information from the one of the scanning means and the optical memory means in only one of at least two display areas.

4,931,958

DISPLAY SYSTEM WITH FEWER DISPLAY MEMORY CHIPS

Susumu Takeda, Kasugai, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Dec. 21, 1987, Ser. No. 135,323
Claims priority, application Japan, Dec. 29, 1986, 61-314361
Int. Cl.[5] G06F *12/02*
U.S. Cl. 364—521 **3 Claims**



1. A display system for reducing a number of display memory chips comprising:

pattern data storing means for storing pattern data of a plurality of characters and for outputting the pattern data of a character to a display responsive to a code data of the character;

display data sorting means for storing a plurality of character code data to be displayed on the display;

display control means for outputting address data having a predetermined number of bits, the address data being updated at a predetermined cycle time;

address modification means for concatenating one or more bits from a clock signal to the address data and for outputting the concatenated address data to the display data storing means so that the display data storing means outputs the character code data corresponding to the address data to the pattern data storing means and to a character code holding means, the bit or bits being updated at a cycle time which is a division of the predetermined cycle time; and

said character code holding means temporarily holding the character code data outputted from the display data sorting means every time the address data are updated and outputting all the character code data held therein to the pattern data storing means when the predetermined cycle time has elasped.

4,931,959

OPTICAL SHUFFLE ARRANGEMENT

Karl-Heinz Brenner, Altdorf, Fed. Rep. of Germany; Alan Huang, Middletown, N.J., and Adolf W. Lohmann, Uttenreuth, Fed. Rep. of Germany, assignors to AT&T Bell Laboratories, Murray Hill, N.J.

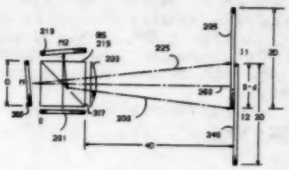
Continuation of Ser. No. 748,408, Jun. 24, 1985, abandoned.
This application Jan. 11, 1989, Ser. No. 296,284
Int. Cl.[5] G06G *9/00*; G02F *1/29*
U.S. Cl. 364—525 **13 Claims**

1. An optical information switching arrangement for rearranging an applied ordered array of information-bearing light beams comprising:

means for receiving an array of information-bearing light beams;

means for directing said light beams along a plurality of optical paths and for projecting at most two images of the ordered array of information-bearing light beams that travel along said optical paths onto a preselected overlap area of said means for receiving;

means for adjusting the optical paths relative to each other to rearrange the order of said projected information of said two images to form a perfect shuffle of said ordered array of information-bearing light beams within said overlap area; and means for accepting said perfect shuffle rearranged information in said overlap area.

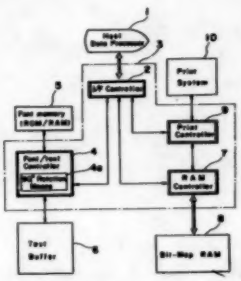


4,931,960

CHARACTER IMAGE GENERATOR FOR STORING IMAGES IN A LANDSCAPE AND POTRAIT ORIENTATION

Takashi Morikawa, Toyokawa, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Jul. 23, 1987, Ser. No. 77,417
Claims priority, application Japan, Jul. 23, 1986, 61-174513
Int. Cl.[5] G06F *3/12*
U.S. Cl. 364—519 **4 Claims**



1. In a printer system in which bit images of characters to be printed are read out from a font memory in correspondence with character code data sent from a host data processor, the improvement comprising:

a font RAM provided in said font memory for memorizing bit images of external characters to be downloaded from said host data processor;

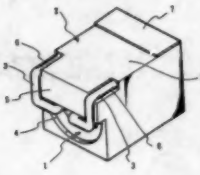
means for receiving one bit image for an external character downloaded from said host data processor and for rotating the bit image of the external character downloaded by 90 degrees, to thereby produce a rotated bit image of the external character, and

means for registering said bit image downloaded together with said rotated bit image into said font RAM.

4,931,961
CHIP TYPE CAPACITOR AND MANUFACTURE THEREOF

Susumu Ando, and Ikuo Hagiwara, both of Tokyo, Japan, assignors to Nippon Chemi-Con Corporation, Tokyo, Japan

Filed Mar. 7, 1989, Ser. No. 332,784
Claims priority, application Japan, Mar. 7, 1988, 63-54599; Jun. 29, 1988, 63-161431; Aug. 11, 1988, 63-200383; Nov. 7, 1988, 63-280864
Int. Cl.[5] H01G 9/24; H05K 1/18
U.S. Cl. 361—535 10 Claims

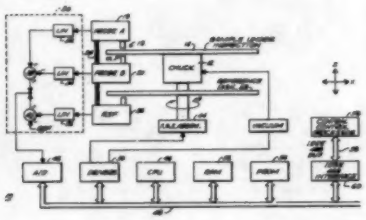


1. A chip-type capacitor disposed in a sheathing frame, a pair of terminals extending from one end face of said capacitor, said terminals being both bent over onto the same underside of the sheathing frame, and a metal layer on said underside spaced from said terminals, whereby both said terminals and said metal layer are adapted to be soldered onto a same surface of a printed circuit board.

4,931,962
FIXTURE AND NONREPEATABLE ERROR COMPENSATION SYSTEM

Benjamin Palleiko, Stoughton, Mass., assignor to ADE Corporation, Newton, Mass.

Filed May 13, 1988, Ser. No. 193,958
Int. Cl.[5] G01B 7/00; G01C 25/00
U.S. Cl. 364—550 20 Claims



1. An error compensation system, comprising:

a movable fixture to which a sample to be measured is releasably mounted;

means coupled to said movable fixture for moving same over a range of movement;

fixture position indicating means for providing a measurable reference indicative of ideal fixture position of said movable fixture, said fixture position indicating means being mounted for movement with the movable fixture in such a way that the measurable reference is moved by and with the movable fixture;

means including a first sensor spaced from the movable fixture and within the range of movement of the movable fixture for providing a measurement signal representative of a characteristic associated with the sample as the sample is moved relative to the fist sensor by the movable fixture;

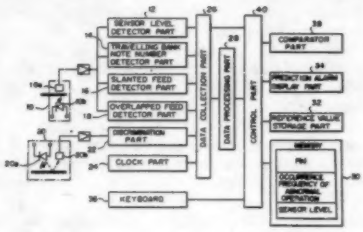
means including a second sensor stationary with respect to said first sensor that is spaced from the movable fixture and within the range of movement of the movable fixture for providing an error signal representative of any derivation of the movable fixture from said ideal fixture position as the measurable reference of the fixture position indicating means is moved relative to the second sensor by the movable fixture moving the sample relative the the first sensor; and

means for cancelling from the measurement signal the error signal to provide an output signal compensated for deviations of the fixture from the ideal fixture position.

4,931,963
SELF-DIAGNOSIS METHOD FOR A BANK NOTE DEPOSITING AND DISPENSING MACHINE

Haruo Kimura; Minematsu Nobuo, and Suto Shin-ichi, all of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 932,569, Nov. 20, 1986, abandoned. This application Aug. 3, 1988, Ser. No. 229,731
Claims priority, application Japan, Nov. 22, 1985, 60-261490; Nov. 22, 1985, 60-261491
Int. Cl.[5] G06F 15/20
U.S. Cl. 364—551.01 16 Claims



1. A method of self-diagnosis of a need for maintenance of parts and units of a bank note depositing and dispensing machine, wherein bank notes are accepted for deposit and are dispensed by said machine during which said parts and units perform respective tasks in connection with depositing and dispensing of said bank notes and change over time as a function of performance of such tasks, said method comprising:

(a) collecting respective number data, representative of a number of travelling bank notes in connection with which said tasks are performed by each said part and unit and corresponding to an amount of change over time of each said part and unit, by means of a plurality of sensors provided along paths of travel of the bank notes in the bank note depositing and dispensing machine;

(b) storing in a memory the thus collected number data corresponding to each said part and unit after adding said collected number data to previously collected number data representative of a number of bank notes previously detected by said sensors for each said part and unit;

(c) comparing the collected number data stored in said memory with a reference value previously defined and stored for each said part and unit;

(d) storing prediction alarm data in said memory for each said part and unit if said collected number data corresponding thereto is equal to or exceeds said reference value corresponding thereto;

(e) reading the thus stored prediction alarm data in said memory when a request instruction therefor is issued;

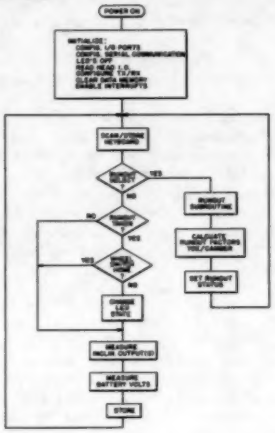
(f) diagnosing whether said prediction alarm data is provided in the thus read data; and

(g) displaying a prediction alarm representative of a presence of said prediction alarm data in said read data as an indication of a need for maintenance of each said part and unit.

4,931,964
VEHICLE WHEEL ALIGNMENT APPARATUS AND METHOD

Raymond Titsworth, Conway; J. Tom Lipe, Little Rock; James L. Dale; Hanford D. Monroe, both of Conway, and Jerry M. Hill, North Little Rock, all of Ark., assignors to FMC Corporation, Chicago, Ill.

Filed Sep. 7, 1984, Ser. No. 648,442
Int. Cl.[5] G01B *7/315, 11/275*
U.S. Cl. 364—559 **46 Claims**



33. A method of aligning wheels on a vehicle utilizing an intelligent alignment measurement system having a plurality of wheel mounted alignment heads and a remote console including a main processor and a plurality of functional modules including a communications module, comprising the steps of

initializing the system by downloading digitized decision making and communications instructions from the plurality of functional modules to the main processor, whereby the system is automatically configured in accordance with the specific functional modules present in the system,

measuring wheel alignment parameters and head status signals at separate ones of the vehicle wheels,

digitizing the parameter and status measurements to obtain digital alignment data,

storing digitized data at separate ones of the vehicle wheels, and

serially transmitting and receiving instructions and digitized data between the communications module and different ones of the alignment heads.

4,931,965
COORDINATES INPUT APPARATUS

Kiyoshi Kaneko, Yokohama; Atsushi Tanaka, Kawasaki; Yuichiro Yoshimura, Tokyo; Katsuyuki Kobayashi, Tokyo, and Shinnosuke Taniishi, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 29, 1987, Ser. No. 67,546
Claims priority, application Japan, Jun. 27, 1986, 61-149742; Jun. 27, 1986, 61-149743; Jul. 4, 1986, 61-156231; Jul. 4, 1986, 61-156232; Jul. 4, 1986, 61-156233; Jul. 4, 1986, 61-156234; Jul. 4, 1986, 61-156235; Jul. 4, 1986, 61-156236; Jul. 4, 1986, 61-156237; Oct. 17, 1986, 61-245470; Oct. 17, 1986, 61-245472; Oct. 17, 1986, 61-245474; Oct. 17, 1986, 61-245475; Oct. 22, 1986, 61-249738
Int. Cl.[5] G01B *17/00*
U.S. Cl. 364—560 **81 Claims**

1. A coordinates input apparatus comprising:

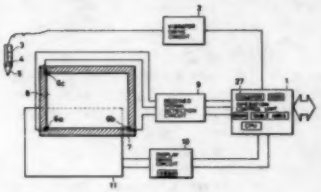
vibration propagation means for allowing a vibration to propagate therethrough;

an input pen for applying vibration to said vibration propagation means;

vibration detecting means for detecting vibration applied by said input pen;

envelope output means for producing an envelope signal representing the envelope of the vibration detected by said vibration detecting means;

differentiation means for conducting a differentiation of said envelope signal produced by said envelope output means;



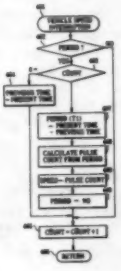
control means adapted for determining, a: the time of arrival of said vibration, a zero-cross point of said vibration detected by said vibration detecting means located in the vicinity of a zero-cross point of the signal from said differentiation means; and

computing means for computing the distance between said input pen and said vibration detection means from the time determined by said control means.

4,931,966
METHOD OF MEASURING VEhICLE SPEED

Kouichi Ishizaka, Saitama, Japan, assignor to Jidosha Kiki Co., Ltd., Tokyo, Japan

Filed Jun. 24, 1988, Ser. No. 210,816
Claims priority, application Japan, Jul. 8, 1987, 62-168820
Int. Cl.[5] G01P *3/42, 3/44*
U.S. Cl. 364—565 **2 Claims**



1. A method of measuring vehicle speed comprising the steps of:

(a) determining an initial vehicle speed;

(b) receiving a plurality of vehicle speed signal inputs;

(c) generating pulses corresponding to said vehicle speed signal inputs;

(d) counting the number of pulses generated during a predetermined time interval;

(e) calculating vehicle speed based on said number of counted pulses generated during said predetermined time interval;

wherein said initial vehicle speed determining step includes the steps of:

(i) receiving a first vehicle speed signal pulse after a vehicle speed measurement power supply has been turned on;

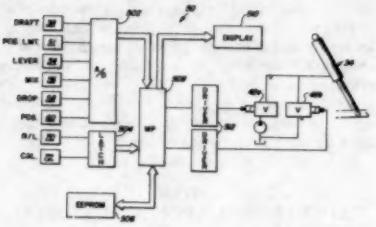
(ii) generating a second vehicle speed signal pulse having a period corresponding to said first vehicle speed signal pulse;
(iii) measuring the period of said generated pulse;
(iv) predicting a number of pulses, which will be generated during said predetermined time interval corresponding to said first and second vehicle speed signal pulses, based upon the measured period;
(v) determining said initial vehicle speed based on said predicted number of pulses.

4,931,967

CONTROL SYSTEM CALIBRATION

Thomas E. Boe, Grundy County; Mark A. Bergene; Carl E. Kittle, both of Cedar Falls, and Gregory E. Sparks, Waterloo, all of Iowa, assignors to Deere & Company, Moline, Ill.

Filed Jan. 6, 1989, Ser. No. 294,537
Int. Cl.[5] A01B *63/112*
U.S. Cl. 364—571.01 **1 Claim**
MICROFICHE APPENDIX INCLUDED
(2 Microfiche, 140 Pages)



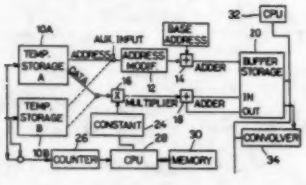
1. In a hitch control system having a command lever movable within a predetermined range of positions, a lever position sensor generating lever position signals, a control unit coupled to the sensor and generating control signals as a function of the sensed lever positions, and an actuator movable in response to the control signals, a calibration method comprising:
moving the lever through its entire range of positions;
automatically determining a range of magnitude of the lever position signals corresponding to the range of positions through which the lever is moved; and
automatically adjusting the control unit as a function of the determined range of magnitude of the lever position signals.

4,931,968

DATA CORRECTION CIRCUIT FOR POSITION EMISSION COMPUTED TOMOGRAPH

Yoshiharu Hirose, Kyoto, Japan, assignor to Shimadzu Corporation, Kyoto, Japan

Filed May 27, 1988, Ser. No. 199,839
Claims priority, application Japan, May 30, 1987, 62-137216
Int. Cl.[5] G06F *15/74, 15/42*
U.S. Cl. 364—571.02 **7 Claims**



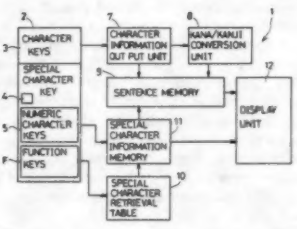
1. A data correction circuit for use in a positron ECT wherein uncorrected data is produced by coincidence circuits upon annihilation of positrons, said data correction circuit comprising:
first and second temporary storages for temporarily storing uncorrected data produced by the coincidence circuits, one of said temporary storages collecting data while the other outputs uncorrected data;
a buffer storage for storing data in a plurality of addressable frame regions;
a data circuit and an address circuit connected between said temporary storages and said buffer storage;
an address modification storage connected in said address circuit;
an adder responsive to said address modification storage and a source of region base addresses for addressing said buffer storage;
means for storing a constant; and
arithmetic means connecting in said data circuit for performing dead time correction and decay correction on said data by performing arithmetic operations on uncorrected data from said temporary storages, said arithmetic means being connected to said means for storing a constant and including means resposive to said means for storing a constant for modifying said uncorrected data according to said constant.

4,931,969

CHARACTER ENTRY DEVICE

Akira Hirami, and Yasuhiro Taguchi, both of Nara, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 122,183, Nov. 18, 1987, abandoned.
This application Oct. 16, 1989, Ser. No. 423,558
Claims priority, application Japan, Nov. 18, 1986, 61-274855
Int. Cl.[5] G06F *3/147*
U.S. Cl. 364—709.15 **11 Claims**



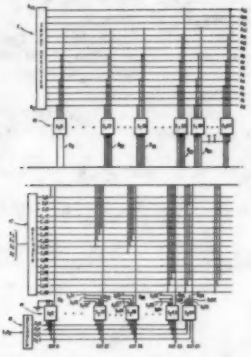
1. A method of entering characters not represented on keys of a character entry device by utilizing the character entry device containing numeric, special, and specific keys as input means, comprising the steps of:
storing a plurality of characters and code numbers corresponding to said plurality of characters, in a first memory means;
entering a special input mode by depression of a special key of said input means;
displaying a menu of characters available to be selected in response to the depression of said special key input means;
selecting a desired character by depression of a specific key input means which corresponds to said displayed desired character, if said desired character was previously displayed;
entering a code number corresponding to a desired character, as stored in said first memory means, if said desired character was not previously displayed;
storing said entered code number and said corresponding desired character in a second memory means, said second memory means thereby associating said desired character with a specific key input means; and
displaying said stored desired character.

4,931,970

APPARATUS FOR DETERMINING IF THERE IS A LOSS OF DATA DURING A SHIFT OPERATION

Peter W. Cook, Mount Kisco, N.Y., and Robert K. Montoye, Austin, Tex., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 13, 1989, Ser. No. 297,639
Int. Cl.[5] G06F 7/38
U.S. Cl. 364—715.08 6 Claims



1. In a shift circuit, apparatus for determining if there is a loss of data when shifting a first data field of n bits into a second field of (m).(n) bits, where m is an integer ≧2, comprising:

means for decoding s, where s is an integer, scale factor signals, to provide m control signals indicative of a first amount of shift, and n control signals indicative of a second amount of shift, with the sum of the amounts specified by said m and n control signals specifying the total amount of shift for said circuit;

(m).(n) data switches at a first switching level, with each such switch having m data inputs for receiving predetermined input bits of said first data field, and m control inputs for receiving predetermined ones of said n control signals for selecting one of said predetermined inputs bits as an output of said each such switch;

m overflow switches at said first switching level, with each such switch having m data inputs for receiving predetermined input bits of said first data field, with an output of each overflow switch being connected together to form a single output, with m control inputs for receiving predetermined ones of one or more of said n control signals for testing if any of said predetermined input bits is in a predetermined state and if so providing an overflow indication to said single output;

(m).(n) data switches at a second switching level, with each such switch having m data inputs for receiving predetermined outputs from said data switches at said first switching level, and m control inputs for receiving predetermined ones of said m control signals for selecting one of said predetermined outputs from said data switches at said first switching level as an output of said each such switch; and

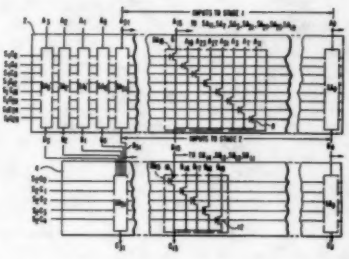
one overflow switch at said second switching level, having m data inputs, with one data input connected to the single output of said m overflow switches and the other (m−1) data inputs being connected to receive predetermined outputs from said data switches at said first switching level, and m control inputs for receiving predetermined ones of one or more of said m control signals for testing if any of said (m−) inputs is in said predetermined state, or if said one data input has an overflow indication, and if so, providing an overflow bit at an output of said one overflow switch.

4,931,971

PARTIAL DECODE SHIFTER/ROTATOR

Peter W. Cook, Mount Kisco, N.Y., and Robert K. Montoye, Austin, Tex., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 13, 1989, Ser. No. 297,170
Int. Cl.[5] G06F 7/38
U.S. Cl. 364—715.08 6 Claims



1. A circuit for one of shifting and rotating an input N-bit binary word, comprising:

means for decoding n, where n is an integer, scale factor signals, including decoding the first through i, where i is an integer >2, scale factor signals to provide a first plurality of control signals indicative of a first amount of one of shift and rotate, and decoding and (i+1) through n scale factor signal to provide a second plurality of control signals indicative of a second amount of one of shift and rotate, with the amount of one of shift and rotate specified by said first and second plurality of control signals specifying the total amount of one of shift and rotate

a first level of N switches for receiving said input N-bit binary word at N inputs thereof, with each such switch having >2 inputs connected to predetermined ones of said N inputs, and which are responsive to one of said first and second plurality of control signals for providing a first N-bit binary word at the output thereof which is said input N-bit binary word one of shifted and rotated by one of said first and second amounts; and

a second level of N switches, for receiving said first N-bit binary word at N inputs thereof, with each such switch having >'inputs connected to predetermined one of said N inputs, and which are responsive to the other of said first and second plurality of control signals for providing an output N-bit binary word which is said first N-bit binary word one of shifted and rotated by the other of said first and second amounts.

4,931,972

MULTIPLE-INPUT DIGITAL FILTER

Yoshimori Obata, and Makoto Toko, both of Tokyo, Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Filed May 24, 1988, Ser. No. 198,055
Claims priority, application Japan, May 26, 1987, 62-127106
Int. Cl.[5] G06F 7/38
U.S. Cl. 364—724.13 7 Claims

1. A multiple-input digital filter comprising:

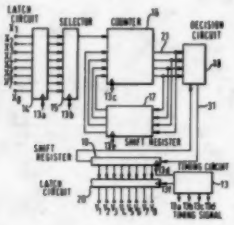
receiver means for receiving a plurality of digital input signals at one time and outputting one of the digital signals at a time;

counter means, coupled to the receiving means, for conducting predetermined counting operations according to the outputted values of the digital input signals, the counting operations producing count values each corresponding to one of the digital input signals;

decision circuit means, coupled to the counter means, for

outputting a predetermined decision value signal from a time when each count value corresponding to one of the digital input signals reaches a first predetermined value to a time when the same count value reaches a second predetermined value;

holding means, coupled to the counter means, for holding



the count values and for supplying one of the count values as a preset value to the counter means for a corresponding digital input signal; and

output circuit means, coupled to the decision circuit means, for latching each of the decision values corresponding to the digital input signals and for simultaneously outputting a plurality of the decision values.

4,931,973

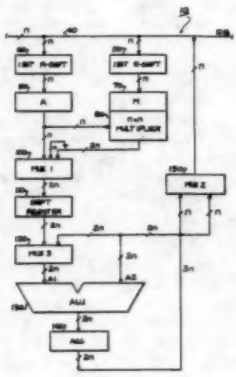
METHOD OF GENERATING UPDATED TRANSVERSAL FILTER COEFFICIENTS

Safdar M. Asghar, 1208 Rembrandt Dr., Sunnyvale, Calif. 94087; Hwa-Sheng Pyi, 1235 Ayala Dr., Apt. 20, Sunnyvale, Calif. 94086, and Dermot Dunnion, 3532 Geneva Dr., Santa Clara, Calif. 95051

Division of Ser. No. 891,713, Jul. 30, 1986, Pat. No. 4,800,517. This application Sep. 19, 1988, Ser. No. 245,617

Int. Cl.[5] G06F *15/31*

U.S. Cl. 364—724.16 **1 Claim**



1. A method of continuously generating updated 2n-bit adaptive transversal filter coefficients for a transversal filter having N stages, said method being arranged to implement the following relationships:

$$Ai(j+1) = Ai(j) + u*e(j)*X(j-i),\ i = 0, 1, 2, \ldots, N-1,$$

and

-continued

$$Y(j) = \sum_{j=0}^{N-1} Ai(j)*X(j-i)$$

where Ai(j) are the 2n-bit coefficients of the adaptive transversal filter, Y(j) is a 2n-bit filter output, X(j−i) is an n-bit input sample at an ith filter stage, e(j) is an n-bit error term equal to the difference between a predetermined output standard and the output of said transversal filter, and u is an n-bit constant, said method comprising the steps of:

(a) providing an nxn bit multiplier;

(b) conveying said n-bit error term e(j) to said multiplier;

(c) conveying the n-bit input sample at an ith filter stage to said multiplier;

(d) multiplying said n-bit error term e(j) by said n-bit input sample at an ith filter stage X(j−i) to obtain a first 2n-bit product;

(e) storing the most-significant n bits of said first 2n-bit product;

(f) conveying said most-significant n bits of said first 2n-bit product to said multiplier;

(g) conveying said n-bit constant to said multiplier;

(h) multiplying the most-significant n bits of said first 2n-bit product by said n-bit constant u to obtain a second 2n-bit product;

(i) providing a 2n-bit adder;

(j) conveying the most-significant n bits of an immediately preceding 2n-bit coefficient Ai(j) to said adder;

conveying said 2n-bit second product to said adder;

(l) adding the most-significant n bits of said immediately preceding 2n-bit coefficient Ai(j) to said second 2n-bit product to obtain a 2n-bit first partial sum;

(m) providing a 2n-bit shifter;

(n) conveying the least-significant n bits of said 2n-bit immediately preceding coefficient Ai(j) to said shifter;

(o) shifting said least-significant n bits in said shifter to the right by n bits;

(p) conveying the least-significant n bits of step (o) to said 2n-bit adder;

(q) adding the least-significant n bits of step (o) to said 2n-bit first partial sum to generate an updated 2n-bit transversal filter coefficient Ai(j+1);

(r) repeating steps (a) through (q) for generating a respective updated 2n-bit coefficient Ai(j+1) for each repective filter stage of said N stages;

(s) conveying to said nxn bit multiplier the most-significant n bits of said coefficient Ai(j) and its corresponding n-bit input sample X(j−i);

(t) multiplying said most-significant n bits of said filter coefficient Ai(j) by its corresponding input sample X(j−i) to generate a 2n-bit filter output;

(u) repeating steps (s) and (t) for each said filter stage;

(v) providing a 2n-bit accumulator;

accumulating the filter outputs for each said stage obtained in step (t) and said 2n-bit accumulator to generate the 2n-bit filter output Y(j);

(x) comparing the most-significant n bits of each said filter output Y(j) with a predetermined n-bit standard for generating an updated error term; and

(y) repeating steps (a) through (x).

4,931,974

SIXTEEN-BIT PROGRAMMABLE PIPELINED ARITHMETIC LOGIC UNIT

Danh Le Ngoc, Saratoga, and John R. Mick, Los Altos Hills, both of Calif., assignors to Integrated Device Technology, Inc., Santa Clara, Calif.

Filed Jan. 30, 1989, Ser. No. 304,069

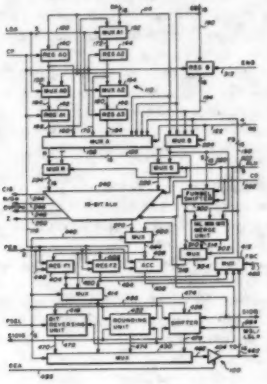
Int. Cl.[5] G06F *7/00*

U.S. Cl. 364—736 **9 Claims**

1. An arithmetic logic system comprising in combination:

a DA bus;

a DB bus;
an R bus;
an S bus;
a FB bus;
a YO bus;
pipeline register means including a set of data inputs connected to said DA bus and a set of data outputs connected to said R bus;
a B register including a set of data inputs connected to said DB bus and a set of data outputs;
a B multiplexer including a first set of data inputs connected to said DA bus, a second set of data inputs connected to said DB bus, a third set of data inputs connected to said B register set of data outputs, a fourth set of data inputs connected to said FB bus, and a set of data outputs connected to said S bus;
an arithmetic logic unit means including a first set of data inputs coupled to said R bus, a second set of data inputs coupled to said S bus, and a set of data outputs;



a funnel shifter including a first set of data inputs connected to said R bus, a second set of data inputs connected to said S bus, and a set of data outputs;
a merge logic unit including a set of merge left data inputs connected to said funnel shifter set of data outputs, a set of merge mask data/control inputs connected to said S bus, a set of merge right data inputs connected to said FB bus, and a set of data outputs;
a funnel shifter/merge logic unit multiplexer including a first set of data inputs connected to said funnel shifter set of data outputs, a second set of data inputs connected to said merge logic unit set of data outputs, and a set of data outputs;
an output means connected to said arithmetic logic unit means set of data outputs, to said funnel shifter/merge logic unit multiplexer set of data outputs, to said FB bus, and to said YO bus.

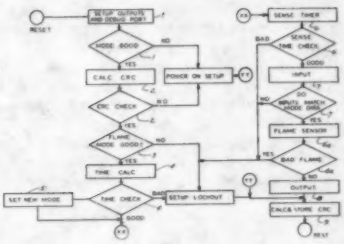
4,931,975

MICROPROCESSOR-BASED CONTROLLER WITH SYNCHRONOUS RESET

Henry A. Gleason, III, Johnson Creek, and Jerel S. Jamieson, Watertown, both of Wis., assignors to Johnson Service Company, Milwaukee, Wis.

Filed Dec. 21, 1987, Ser. No. 135,418
Int. Cl.[5] G06F *15/20*
U.S. Cl. 364—570 **16 Claims**

1. Apparatus for reliably controlling a process, comprising:
a microprocessor having input means for receiving an electrical input signal conveying information about said process and output means for providing an electrical output signal for controlling at least one parameter related to said process; and
means for applying an activating signal, obtained from a source independent of said process, to a reset terminal of said microprocessor means, said activating signal having succeeding, repetitive first and second levels whereupon in operation said microprocessor enters an active state



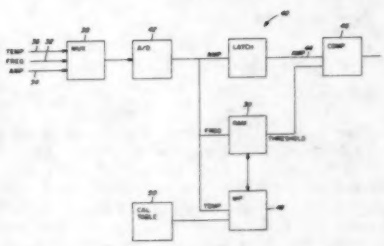
when said activating signal is at the first level and an inactive state when said activating signal is at the second level;
wherein said microprocessor is configured to execute succeeding portions of a linear program in synchrony with succeeding first levels of said activating signal, and to receive said electrical input signal and provide said electrical output signal to thereby control said process.

4,931,976

TEMPERATURE COMPENSATED SIDE LOBE SUPPRESSION

James E. Olivenbaum, Houston, and Mark C. Fischer, Pasadena, both of Tex., assignors to Tideland Signal Corporation, Houston, Tex.

Filed Nov. 3, 1988, Ser. No. 266,560
Int. Cl.[5] H01Q *3/26*
U.S. Cl. 364—571.04 **6 Claims**



1. In a racon having a receiver-detector sensor with frequency and amplitude measuring means for measuring amplitude and frequency of a received radar signal and providing analog outputs, the improvement in a radar side lobe suppression circuit for automatically changing frequency band limits as the temperature of the receiver-detector-sensor varies comprising,
temperature measuring means connected to and measuring the temperature of the receiver-detector-sensor and providing an analog output,
means connected to and providing digital outputs representative of the analog outputs of said temperature measuring means, the frequency measuring means, and the amplitude measuring means,
a radar side lobe suppression memory RAM connected to the digital outputs representative of the frequency and

amplitude measurements, said RAM having an output providing a threshold value representative of prior amplitude measurement in response to the frequency input,

a comparator having a first and second input, said first input connected to the output of the RAM for receiving the threshold value and said second input connected to the digital output representative of the presently received radar signal amplitude measurement, said comparator providing a response if the present amplitude is greater than the threshold value,

a microprocessor connected to the digital output representative of the temperature measurement,

a memory storage means containing a predefined temperature frequency calibration table and connected to the microprocessor for determining band edges as a function of temperature, and

said microprocessor connected to said RAM for changing the threshold values stored in said RAM for the purposes of inhibiting out of band and enabling in band frequency transmission of the racon.

4,931,977

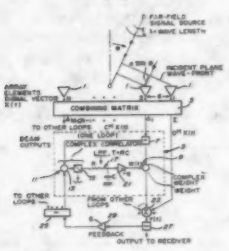
VECTORIAL ADAPTIVE FILTERING APPARATUS WITH CONVERGENCE RATE INDEPENDENT OF SIGNAL PARAMETERS

Marek Klemes, Napean, Canada, assignor to Canadian Marconi Company, Montreal, Canada

Continuation-in-part of Ser. No. 115,246, Oct. 30, 1987, abandoned, which is a continuation-in-part of Ser. No. 782,551, Oct. 1, 1985. This application Nov. 8, 1988, Ser. No. 268,750

Int. Cl.[5] G06G *7/12*; H03B *3/02*

U.S. Cl. 364—581 **37 Claims**



1. For use with a sensor array arrangement, which senses both a desired signal and interference signals having an intensity and characterized by relative amplitudes and phases, comprising a first plurality of sensors connected to a combining matrix having a second plurality of outputs, an adaptive signal processor for causing constant convergence of weights which reduce the intensity of interference signals, while preserving the desired signal, independently of signal parameters at an output terminal means of said adaptive processor;

said second plurality being less than or equal to said first plurality;

said adaptive signal processor comprising:

a third plurality of adaptive control loops;

said third plurality being less than or equal to said second plurality;

(A) each said control loop comprising:

each input terminal connected to a different one of said second plurality of outputs of said combining matrix;

a first power divider having an input terminal, a first output terminal and a second output terminal, the input terminal of said control loop being connected to the input terminal of said first power divider;

a second power divider having an input terminal, a first output terminal and a second output terminal;

the first output terminal of said first power divider being connected to the input terminal of said second power divider;

a first complex weighter means having first input terminal means, second input terminal means and output terminal means;

the second output terminal of said second power divider being connected to the first input terminal means of said first complex weighter means;

complex correlator means having first input terminal means, second input terminal means and output terminal means;

the first output terminal of said second power divider being connected to the first input terminal means of said complex correlator means;

a filter arrangement having input terminal means and a first and second output terminal means;

the input terminal means of said filter arrangement being connected to the output terminal means of said complex correlator means;

the first output terminal means of said filter arrangement being connected to the second input terminal means of said first complex weighter means;

second complex weighter means having first input terminal means, second input terminal means and output terminal means;

the second output terminal means of said filter arrangement being connected to the second input terminal means of said second complex weighter means;

the second output terminal of said first power divider being connected to the first input terminal means of said second complex weighter means;

(B) said loops being closed by:

first summer means having a plurality of input terminals, said plurality being equal to said second plurality, and an output terminal means;

one input terminal of said first summer means being connected to a source of a reference signal;

the input terminals of said first summer means being connected to said output terminal means of said second complex weighter means of respective ones of the control loops;

second summer means having a plurality of input terminals equal to said third plurality and an output terminal;

the input terminals of said second summer means being connected to said output terminal means of said first complex weighter means of respective ones of the control loops;

a third power divider having an input terminal, a first output terminal and a second output terminal;

the input terminal of said third power divider being connected to the output terminal means of said first summer means;

third summer means having first input terminal, a second input terminal and an output terminal;

the first input terminal of said third summer means being connected to the first output terminal of said third power divider;

a fourth power divider having an input terminal and a plurality of output terminal equal to said third plurality;

the input terminal of said fourth power divider being connected to the output terminal of said third summer means;

the output terminals of said fourth power divider being connected to second input terminals of complex correlator means of respective ones of said control loops; and

the second output terminal of said third power divider comprising output terminal means of said adaptive signal processor;

whereby, in each said loop, said first power divider directs said desired signal and interference signals into a first path and a second path, the first path leading said desired signal and interference signals, via said second complex weighter means, which adjust said relative amplitudes and phases of said desired signal and interference signals, and subsequently via said first summer means, which causes said interference signals from all said loops to coherently sub-

tract to zero, thereby reducing the intensity of said interference signals from all of said loops, and subsequently to the input terminal of said third power divider;

said second path leading said desired signal and interference signals to the input terminal of said second power divider;

said second power divider further detecting said desired signal and interference signals into a third path and a fourth path, said third path leading said desired signal and interference signals to said first input terminal means of said complex correlator means, and said fourth path leading said desired signal and interference signals, via said first complex weighter means, to said input terminal of said second summer means, and thence, to said second input terminal of said third summer means;

said third power divider further directing any residual remnants of said interference signals and said desired signal into a fifth path which leads said desired signal and said interference signals to said output terminal means of said adaptive processor, and also into a sixth path which leads said desired signal and said interference signals to said first input terminal of said third summer means, which coherently sums the desired signal and interference signals from the sixth path and the desired signal and interference signals from the fourth path and outputs their sum to the input terminal of said fourth power divider means, said fourth power divider means then directing said sum of said desired signals and interference signals of all of said loops into said third plurality of paths each leading to a second input terminal means of said complex correlator means of respective ones of said control loops;

said complex correlator means of each said loop correlating said desired signals and said interference signals arriving into said first input terminal means thereof via said third path with said desired signal and interference signals arriving into the the second input terminal means thereof to produce a resultant signal which is passed to said input terminal means of said filter arrangement, said resultant signal being processed by said filter arrangement so as to produce, at its first output terminal means, a first control signal which is applied to said second input terminal means of said first complex weighter means of each said loop, and, at the second output terminal means thereof, to produce a second control signal which is applied to said second input terminal means of said second complex weighter means of each said loop;

said first complex weighter means of each loop aiding said second control signal for said second complex weighter means of each loop to achieve a constant rate of convergence to an optimal state which causes said interference signals to subtract as they pass through said first summer means thereby reducing the intensity of said interference signals at the output of said adaptive processor.

4,931,978

COMPUTER SUPPORT DEVICE WITH POWER CONTROL DEVICES

Craig D. Drake, Muscatine, Iowa, and Phillip Ting, Chicago, Ill., assignors to Ring King Visibles, Muscatine, Iowa

Filed Oct. 21, 1988, Ser. No. 260,863
Int. Cl.[5] G06F *1/00*; H05K *7/16*
U.S. Cl. 364—708 **11 Claims**

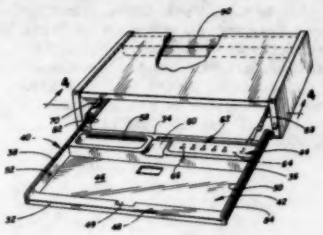
1. A computer control assembly for use with a computer support structure, said assembly comprising:

an electrical power supply unit including multiple power outlets;

a movable keyboard unit which includes a plurality of manually operable electrical control switches and means for supporting a computer keyboard adjacent to said switches, said means for supporting a computer keyboard having a forward distal edge to be disposed toward a user of said keyboard unit;

means for operatively connecting said keyboard unit to such a computer support structure to permit extension and retraction movement of said keyboard unit toward and away from such a user; and

a flexible power cord connecting said electrical control



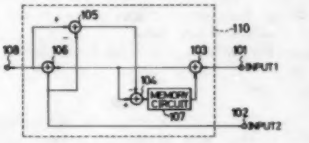
switches to said power supply unit, whereby said switches are moved with said keyboard unit as said keyboard unit is extended relative to such support structure for use by such a user and retracted for storage.

4,931,979

ADDING APPARATUS HAVING A HIGH ACCURACY

Takashi Kamitake, Irvine, Calif.; Shin-ichi Kawamura, Yokohama, and Masahiro Abe, Tokyo, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Aug. 26, 1988, Ser. No. 236,902
Claims priority, application Japan, Dec. 25, 1987, 62-327176
Int. Cl.[5] G06F *7/50*
U.S. Cl. 364—745 **3 Claims**



1. An apparatus for adding a first input value representing a floating point number and a second input value representing another floating point number greater than that represented by the first input value to obtain a sum of the first and second input values, comprising:

memory means for memorizing an underflowing value;

first adder means for adding the underflowing value and the first input value to obtain an intermediate value;

second adder means for adding the intermediate value and the second input value to obtain their sum;

first substractor means for subtracting the second input value from the sum to obtain a reference value; and

second subtractor means for subtracting the reference value from the intermediate value to obtain the underflowing value to be memorized in the memory means.

4,931,980

DIGITAL COMPUTING DEVICE FOR A DATA TRANSMISSION INSTALLATION USING CODE 2B 1Q OR THE LIKE

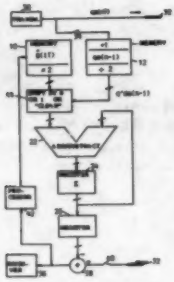
Jean-Christophe Rault, Perros Guirec, France, assignor to Etat Francais, Represente par le Ministre des Postes, Telecommunications et de l'Espace (Centre National d'Etude des Telecommunications) CNET, Issy Les Moulineaux, France

Filed Jul. 28, 1988, Ser. No. 225,493

Claims priority, application France, Jul. 30, 1987, 87 10821

Int. Cl.[5] G06F *15/31*

U.S. Cl. 364—750.5 **5 Claims**



1. A digital computing device for computing in real time a sum of terms of the form:

$$\Sigma h(iT).qe((n-i)T)$$

in which

T designates a sampling period,

i designates successive instants, at mutual intervals T,

n is a predetermined integer greater than 1,

qe are estimated values of transmitted data qe coded in code 2B 1Q, each of said transmitted data having one of the values -3, -1, $+3$ and $+1$ only, comprising:

means for transforming each of the estimated values of data qe into transformed values qde which are powers of 2, by addition or subtraction of a same number to or from all the estimated values qe;

means for computing successive elementary products each obtained by an operation selected from transfer, change to zero and shift of h(iT) in response to respective values of qde; and

means for summing the successive elementary products.

4,931,981

MULTI-PLACE RIPPLE-CARRY ADDER

Karl Knauer, Grafing, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

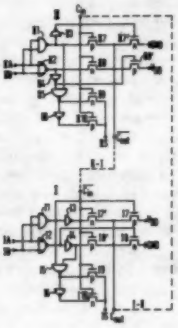
Continuation of Ser. No. 902,641, Sep. 2, 1986, abandoned. This application Oct. 4, 1989, Ser. No. 418,803

Claims priority, application Fed. Rep. of Germany, Sep. 30, 1985, 3534863

Int. Cl.[5] G06F *7/50*

U.S. Cl. 364—784 **4 Claims**

1. A multiple place ripple-carry adder suitable for CMOS technology comprising two types of adder cells, the adder cells of the first type connected to receive two operand input signals and an inverted carry signal, and to produce output signals corresponding to the sum and the non-inverted carry output in accordance with said inputs, the adder cells of said second type being connected to receive first and second operand inputs and a non-inverted carry signal and to produce sum and inverted carry output signals in response to said first and second operand inputs and a non-inverted carry signal, each type of adder cell comprising a carry gate arrangement for producing its said carry output signal, said carry gate arrangement incorporating first means to manifest said carry output from said carry input through only a single transfer transistor acting as a transfer gate, and second means to manifest said carry output through



a series connection of two transistors, one of said two transistors being a transfer gate, said transistor of said transfer gate not being a component part of a combination gate within the carry gate arrangement, whereby said transfer transistors of said carry gate arrangement have signifcantly lower impedance than the other transistors of said carry gate arrangement.

4,931,982

METHOD FOR CONTROLLING THE THICKNESS OF A SHEET MATERIAL AND METHOD FOR MONITORING A CORRESPONDENCE RELATIONSHIP BETWEEN THE THICKNESS DISTRIBUTION ACROSS A SHEET MATERIAL AND MEANS FOR ADJUSTING THE THICKNESS

Shinichiro Hayashida, North Kingstown, R.I.; Hidetoshi Okashiro, and Shunichi Yorozu, both of Otsu, Japan, assignors to Toray Industries, Inc., Tokyo, Japan

Filed Jul. 15, 1988, Ser. No. 219,196

Claims priority, application Japan, Jul. 17, 1987, 62-177127

Int. Cl.[5] B29F *3/00*; D21F *1/00*

U.S. Cl. 364—473 **24 Claims**

1. A method for controlling the thickness of a sheet of material formed by delivering a web of molten material from a die and subjecting the web of molten material to a sheet forming process, which method includes the steps of

(1) providing on the die a plurality of means for adjusting the thickness of the web of molten material,

(2) for each adjusting means, providing

(i) an estimate, which is at least a rough estimate, of a correspondence relationship between (a) a position of the adjusting means on the die in the width direction of the adjusting means at a given time, and (b) after formation of the sheet material by the sheet forming process, a position on the sheet material by the sheet forming process, a position on the sheet at which position the thickness of the sheet is varied by the said adjustment of the adjusting means and an amount of thickness variation at a time subsequent to the said given time and caused by the said adjustment at the given time, thereby to obtain an estimated correspondence relational matrix A^*_{i-1} for all said adjusting means, and

(ii) a measured thickness distribution, P_{i-1}, in the width direction of the sheet material at a time t_{i-1},

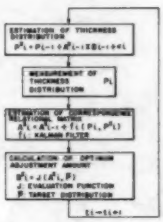
(3) measuring the thickness distribution, P_i, in the width direction of the sheet material at a time t_i,

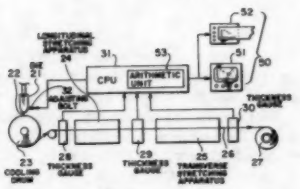
(4) using an equation including the estimated correspondence relational matrix, A^*_{i-1}, and the measured thickness distribution P_{i-1},

(i) calculating an estimated thickness distribution, P^*_i, at a time t_i and determining the difference between the estimated thickness distribution P^*_i and the measured thickness distribution P_i, and

(ii) where a said difference occurs, amending the said estimated correspondence relational matrix A^*_{i-1} in dependence upon the said difference, to give an amended estimated correspondence relational matrix A^*_i,

the said steps (i) and (ii) being performed by means of a Kalman filter and repeated at each time t_{i-1}, t_{i+2}, . . . t_{i+n} at which a said difference occurs using respective estimated correspondence relational matrices A^*_i, A^*_{i+1}, . . . A^*_{i+n} and respective measured thickness distributions P_i, P_{i+1}, . . . P_{i+n}, so that said amended estimated correspondence relational matrices A^*_{i+1}, A^*_{i+2}, . . . A^*_{i+n}, are successively provided, whereby the measured thickness distribution P_{i+1}, P_{i+2}, . . . P_{i+n} approaches a target thickness distribution $\bar{P}$,


ESTIMATION OF THICKNESS DISTRIBUTION
MEASUREMENT OF THICKNESS DISTRIBUTION
CALCULATION OF OPTIMUM ADJUSTMENT AMOUNT



(5) calculating, from the said estimated correspondence relational matrix resulting from step (4), an optimum setting for each adjusting means in dependence upon the target distribution $\bar{P}$, and

(6) automatically controlling the settings of the adjusting means in accordance with the said optimum setting to provide an optimum thickness distribution.

4,931,983

DATA PROCESSOR CAPABLE OF ACCESSING THE CONTENT OF INTERNAL COUNTERS AT A HIGH SPEED

Mitsue Abe, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Jan. 19, 1988, Ser. No. 145,079

Claims priority, application Japan, Jan. 16, 1987, 62-7577

Int. Cl.[5] G06F *9/00*

U.S. Cl. 364—900 **12 Claims**

1. A data processing comprising:

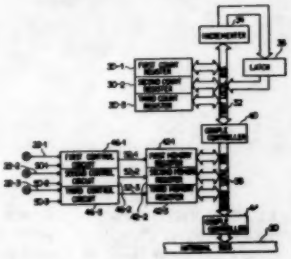
memory means for storing programs and various data;

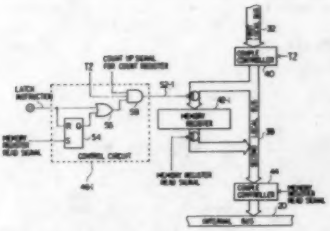
execution means coupled to the memory means to execute processing based upon the programs stored in the memory means;

a plurality of counter means carrying out a count operation at a predetermined interval of time, respectively, each of the counter means being composed of a count register being incremented by an incrementing means at each corresponding count-up operation cycle;

a corresponding number of memory register means for temporarily storing a content of the corresponding counter means, respectively; and

control means operative in response to a latch instruction signal supplied from an external device so as to output a latch signal to a corresponding memory register means thereby to cause the corresponding memory register





means to store an incremented data when the count register of the corresponding counter means is incremented by the incrementing means, the control means also responding to a memory register read signal from the execution means so as to output the latch signal to the corresponding memory register thereby to cause the corresponding memory register means to store the incremented data at each time when the count register of the corresponding counter means is incremented by the incrementing means.

4,931,984

FILE DATA RETRIEVING SYSTEM USING RETRIEVAL-USE-IMAGE DATA

Yoshihide Ny, Yokohama, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Jul. 22, 1988, Ser. No. 222,798

Claims priority, application Japan, Jul. 31, 1987, 62-192291

Int. Cl.[5] G06F *15/40*

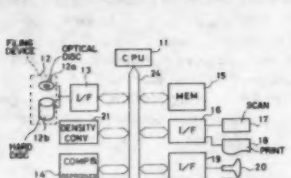
U.S. Cl. 364—900 **18 Claims**

1. A file data retrieving system comprising:

filing means for storing file data and retrieval-use-image data used for retrieving file data, the file data being stored in a predetermined data form, the retrieval-use-image data having an image density smaller than that of the file data;

image data reproducing means for reproducing image data to be displayed from each of the file data and the retrieval-use-image data; and

display means for displaying the image data supplied from the image data reproducing means, the display means



displaying the image data reproduced from the retrieval-use-image data when retrieving the file data.

4,931,985

PROGRAMMABLE SEQUENCING DEVICE FOR CONTROLLING FAST COMPLEX PROCESSES

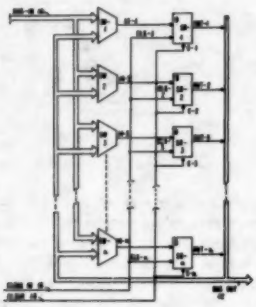
René J. Glaise, Nice, and Pierre Huon, St. Laurent du Var, both of France, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 21, 1988, Ser. No. 171,503

Claims priority, application European Pat. Off., Apr. 22, 1987, 87430013.0

Int. Cl.[5] **G05B** *19/04*

U.S. Cl. 364—900 **3 Claims**



1. A sequencing device which may be set into at least one selected state among a plurality of states, each state controlling the operation of a process in a machine, said selected state(s) depending upon external events which are provided as input signals to the sequencing device through an input bus (10), said device being characterized in that it comprises:

an output bus (12),

a number n of shift register stages (SR) equal to the number of states, each stage having a data input, a clock signal input, a clear input and an output which is coupled to the output bus,

means (16) for providing a clock signal on the clock signal input,

means (18) for providing a clear control signal on the clear input to reset the sequencing device,

switching means (SW-1 to Sw-n) coupled to the input bus and to the output bus and having n output lines (14-1 to 14-n), each one of said lines is coupled to a corresponding data input of one shift register stage, said switching means being conditionally responsive to input signals of the input bus and to signals on the output bus selected as a function of a desired sequence of states for generating an active signal on at least one of said n output lines, which is provided to the corresponding data input of the shift register stage which provides an active signal on its output under control of the clock signal, whereby the state of the sequencing device is set as a function of the states of the input signals and of its previous state.

4,931,986

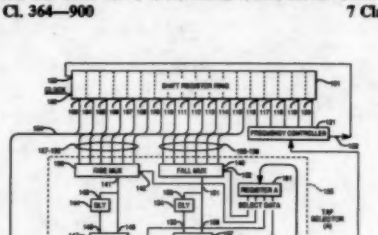
COMPUTER SYSTEM CLOCK GENERATOR FOR GENERATING TUNED MULTIPLE CLOCK SIGNALS

Richard A. Daniel; Stuart C. Rowson, both of Escondido, Calif.; James E. Barnhart, St. Peters, Mo., and Woonsuk Paek, Fremont, Calif., assignors to NCR Corporation, Dayton, Ohio

Filed Mar. 3, 1989, Ser. No. 318,400

Int. Cl.[5] **G06F** *1/04, 1/12;* **H03K** *5/106;* **H04L** *7/033*

U.S. Cl. 364—900 **7 Claims**



1. In a computer system, a computer system clock generator for generating a plurality of system clock signals comprising:

an input clock for producing an input clock signal;

a shift register ring having multiple shifting stages coupled at a first of at least two inputs to said input clock, said input clock signal controlling the shifting of said shifting stages;

coupling means for coupling a second input of said shift register ring to a complemented version of one of a plurality of said shift register stages' output signals; and

at least two tap selectors, each coupled to a plurality of said shifting stages for selectively combining signals output from said shift register ring stages to produce an output clock signal of desired characteristics, which output signals of said tap selectors vary when leaving said tap selectors in such a manner that they arrive in tune at predetermined locations in said computer system after having propagated along separate propagation paths; wherein said coupling means comprises a frequency controller coupled at its inputs to at least two of said shift register ring stages, said controller controlling the frequency of said output clock signals produced by selecting the shift register ring stage signal to be complemented and coupled to said second input.

4,931,987

WORD PROCESSOR FOR LOCATING BEGINNING POSITION OF TEXT ELEMENT AND DISPLAYING CORRESPONDING FORMATTING DATA AND FORMATTING MARK SEPARATELY

Yasushi Kawakami, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan

Filed Dec. 17, 1987, Ser. No. 134,031

Claims priority, application Japan, Dec. 18, 1986, 61-302597

Int. Cl.[5] **G06F** *3/153*

U.S. Cl. 364—900 **4 Claims**

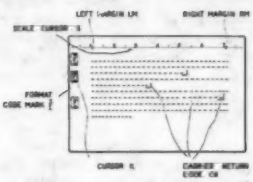
1. In a word processor for processing a text composed of a plurality of text elements, each of said text elements constituted of a series of characters, each of said text elements being individually formatted according to a corresponding format data and being displayed on a text area of a screen, said word processor also displaying a predetermined formatting mark on a

partial area of said screen outside of said text area, a beginning position of each of said text elements being indicated by said predetermined formatting mark; the improvement comprising:

means for storing data concerning said series of characters and said format data in association with each other;

means for placing a cursor in said text area to select one of a plurality of displayed text elements;

means connected to said placing means for retrieving said beginning position of said selected text element;



means for controlling movement of said cursor in such a manner as to move said cursor to a position where said predetermined formatting mark is displayed and corresponded to said beginning position retrieved by said retrieving means;

means connected to said retrieving means for displaying the format data corresponding to the selected text element on a display area outside said text area and said partial area; and

a search key for operating said retrieving means.

4,931,988

COMMUNICATION APPARATUS WITH A REMOTELY ADJUSTABLE SIGNAL LEVEL FUNCTION

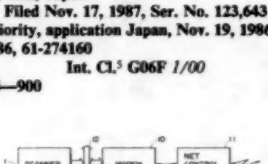
Masakatsu Takahashi, Chigasaki, Japan, assignor to Ricoh Company, Ltd., Japan

Filed Nov. 17, 1987, Ser. No. 123,643

Claims priority, application Japan, Nov. 19, 1986, 61-274159; Nov. 19, 1986, 61-274160

Int. Cl.[5] G06F *1/00*

U.S. Cl. 364—900 **17 Claims**



1. A communication control system for use in a communication apparatus which uses an analog communication network as a transmission line, comprising:

first storing means for temporarily storing a first signal to be transmitted;

transmitting means, connected to said first storing means, for transmitting said first signal stored in said first storing means;

first setting means, connected to or comprising a portion of said transmitting means, for setting a first signal level at which said transmitting means transmits said first signal in accordance with first information supplied through said analog communication network from another communication apparatus which is connected to said communication apparatus through said analog communication network;

receiving means for receiving a second signal transmitted from another communication apparatus through said analog communication network;

said first storing means, connected to said receiving means, also for storing said second signal received by said receiving means; and

second setting means, connected to or comprising a portion of said receiving means, for setting a second signal level to be used by said receiving means in receiving said second signal in accordance with second information supplied through said analog communication network from said another communication apparatus which is connected to said communication apparatus through said analog communication network.

4,931,989

MICROWORD GENERATION MECHANISM UTILIZING A SEPARATE PROGRAMMABLE LOGIC ARRAY FOR FIRST MICROWORDS

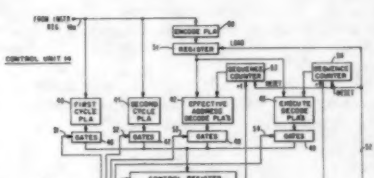
Joseph C. Rhodes, Jr., Boca Raton; Victor S. Moore, Pompano Beach; Wayne R. Kraft, Coral Springs, and John W. Barrs, Hialeah, all of Fla., assignors to International Business Machines Corporation, Armonk, N.Y.

Division of Ser. No. 350,663, Feb. 22, 1982. This application Apr. 15, 1987, Ser. No. 38,556

The portion of the term of this patent subsequent to Aug. 4, 2004, has been disclaimed.

Int. Cl.[5] G06F *9/28*

U.S. Cl. 364—900 **6 Claims**



1. In a microprogrammed data processor wherein a unique sequence of microwords are used to control the execution of each processor instruction, an improved microword generation mechanism comprising:

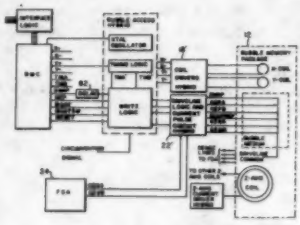
a first programmable logic array mechanism responsive to an operation determining portion of a processor instruction to be executed for providing the first microword of said unique sequence needed in the execution of such instruction;

and at least one additional programmable logic array mechanism operating in parallel with said first programmable logic array responsive to another operation determining portion of this same processor instruction to be executed for providing the remainder of the microwords of said unique sequence needed to execute such instruction.

4,931,990
HARDENED BUBBLE MEMORY CIRCUIT

Bruce C. Perkin, 6205 Gyral Dr., Tujunga, Calif. 91042, assignor to Bruce C. Perkin, Tujunga, Calif.

Filed Nov. 19, 1987, Ser. No. 122,828
Int. Cl.[5] G11C *19/08*
U.S. Cl. 365—1 **18 Claims**



1. A radiation hardened magnetic bubble memory comprising:

a bubble memory device;

a bubble memory control means for tracking and controlling movement of data in, input of data to, and output of data from said bubble memory device;

bubble drive circuits responsive to said bubble memory control means for providing field generating currents for said bubble memory device; and

nonstop logic means connected between said bubble memory control means and said bubble drive circuits for passing control signals generated by said bubble memory control means to said bubble drive circuits,

said nonstop logic means including radiation hardened terminating means responsive to detection of occurrence of a nuclear event for assuring that a rotating magnetic field applied to said bubble memory device prior to occurrence of said nuclear event completes a full rotation thereof and for preventing initiation of a further rotation thereof until termination of said nuclear event,

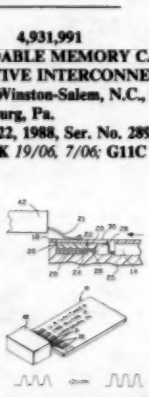
said nonstop logic means thereby operable for providing internally generated field rotation signals to said bubble memory device in response to detection of a nuclear event,

whereby data stored in said bubble memory device is reliably returned to a known accessible state in the presence of a nuclear event.

4,931,991
MACHINE READABLE MEMORY CARD WITH CAPACITIVE INTERCONNECT

George B. Cvijanovich, Winston-Salem, N.C., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Dec. 22, 1988, Ser. No. 289,089
Int. Cl.[5] G06K *19/06, 7/06*; G11C *17/00*
U.S. Cl. 365—52 **5 Claims**

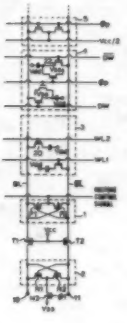


1. In a system for transferring intelligence, a first circuit including memory means for storing said intelligence and for effecting a readout of said intelligence, said first circuit including a plurality of contact pads interconnected to the memory means, each contact pad comprising first and second electrodes separated by an internal dielectric medium having a dielectric constant orders of magnitude greater than the dielectric constant of air, the first electrode being exposed so that the first circuit is adapted to be connected to a second circuit by electrically conductive contact means for establishing an ohmic point contact between the first and second circuit by wiping action with an exposed contact surface on one of the first and second circuits; whereby intelligence can be capacitively transferred between the first and the second circuits, relatively small changes in voltage being detectable due to the relatively large dielectric constant of the internal dielectric medium, so that the interconnection remains substantially unaffected by dielectric materials on the exterior of the exposed contact surface.

4,931,992
SEMICONDUCTOR MEMORY HAVING BARRIER TRANSISTORS CONNECTED BETWEEN SENSE AND RESTORE CIRCUITS

Masaki Ogihara, Yokohama; Yoshio Okada, Tokyo, and Syuso Fujii, Kawasaki, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Continuation of Ser. No. 463, Jan. 5, 1987, abandoned. This application Feb. 9, 1989, Ser. No. 310,020
Claims priority, application Japan, Jan. 17, 1986, 61-7271
Int. Cl.[5] G11C *7/00*
U.S. Cl. 365—189.11 **11 Claims**



1. A semiconductor memory operable in response to a power source potential Vcc, comprising:

a memory cell for storing data;

a bit line pair for transferring the data;

a sense amplifier to amplifying the data from the bit line pair and for sensing the data stored in the memory cell;

a restore circuit directly connected to the bit line pair for restoring the data in the semiconductor memory; and

barrier transistor means for increasing the speed of sensing, said barrier transistor means being connected between the sense amplifier and the restore circuit and having a gate and a constant gate potential sufficient to maintain an ON state.

4,931,993
MEMORY PROTECTION ARRANGEMENT

Teturou Urushima, Yokohama, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Sep. 23, 1987, Ser. No. 100,366
Claims priority, application Japan, Sep. 26, 1986, 61-226287
Int. Cl.[5] G11C *7/00, 8/00*
U.S. Cl. 365—189.01 **8 Claims**

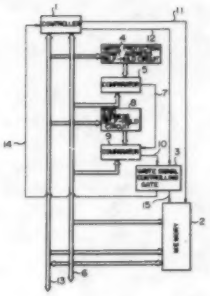
1. A portable terminal device having a memory protected

from being overwritten but which is freely readable, said device comprising:

a memory connected to an address bus and a data bus for storing data contained on the data bus in addresses contained on the address bus and upon receipt of a write signal;

a controller connected to said data bus and address bus and supplying data on the data bus and addresses on the address bus, said controller providing said write signal to enable the storing of data in said memory and a read signal to enable reading of said memory, said controller controlling the writing of data into and the reading of data out of addressed areas of said memory;

a first comparator for producing a first comparison signal when an address on the address bus is greater than a start



address of at least a portion of said memory to be protected from being overwritten;

a second comparator for producing a second comparison signal when an address on said address bus is less than an end address of said portion of said memory to be protected from being overwritten and at the same time said first comparison signal is received by said second comparator; and

a write signal controlling gate for interrupting an application of said write signal from said controller to said memory and for issuing a command to cease normal processing to said controller under control of said second comparison signal, said controller operating to freely allow data contained in said protected portion of said memory to be read out.

4,931,994

STATIC SEMICONDUCTOR MEMORY WITH SECTION AND BLOCK SENSE AMPLIFIERS

Masataka Matsui, Tokyo; Jun-ichi Tsujimoto, Yokohama; Takayuki Ootani, Tokyo, and Mitsuo Isobe, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Feb. 16, 1988, Ser. No. 156,537

Claims priority, application Japan, Feb. 16, 1987, 62-32716

Int. Cl.[5] G11C *7/80*

U.S. Cl. 365—189.01 **14 Claims**

4. A static semiconductor memory divided into a plurality of blocks, wherein each block is divided into a plurality of sections, comprising:

a plurality of bit line pairs, each bit line pair corresponding to a unique column address, wherein the plurality of bit line pairs is divided among the plurality of sections;

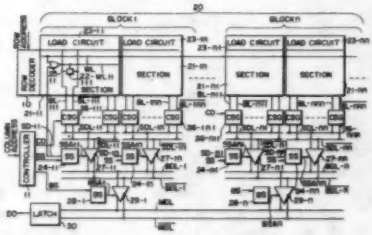
a plurality of memory cells arranged in a two-dimensional array and divided among the plurality of sections, each memory cell coupled to one of the bit line pairs, wherein data is read out from a memory cell and is provided to the bit line pair coupled to the memory cell;

a plurality of section data line pairs, each section data line pair corresponding to one of the sections;

a plurality of column select gate means, each column select gate means coupled between one of the bit line pairs in a section and the section data line pair corresponding to the section, for receiving a column select signal, and for coupling one of the bit line pairs in a section to the corresponding section data line pair in accordance with the column select signal;

a plurality of block data line pairs, each block data line pair corresponding to one of the blocks;

a plurality of section sense amplifier means, each section sense amplifier means coupled between one of the section data line pairs in a block and the block data line pair corresponding to the block, for receiving a section sense amplifier activation signal, and for amplifying data on one of the section data line pairs in a block and supplying the amplified data to the corresponding block data line pair in accordance with the section sense amplifier activation signal;



a main data line pair provided commonly for all of the blocks;

a plurality of block sense amplifier means, each block sense amplifier means coupled between one of the block data lines pairs and the main data line pair, for receiving a block sense amplifier activation signal, and for amplifying data on one of the block data line pairs and supplying the amplified data to the main data line pair in accordance with the block sense amplifier activation signal; and

control means, coupled to the plurality of column select gate means, to the plurality of block sense amplifier means, and to the plurality of section sense amplifier means, for receiving a column address, and for generating, in accordance with the column address, the column select signal, the block sense amplifier activation signal, and the section sense amplifier activation signal, wherein data is read out from a memory cell that is coupled to the bit line pair selected by the column select signal, that is in the block selected by the block sense amplifier activation signal, and that is in the section selected by the section sense amplifier activation signal.

4,931,995

WRITING METHOD IN DRAM

Yasuhiko Okasaka, and Toshiyuki Ogawa, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 27, 1988, Ser. No. 263,157

Claims priority, application Japan, Oct. 28, 1987, 62-274578

Int. Cl.[5] G11C *13/00*

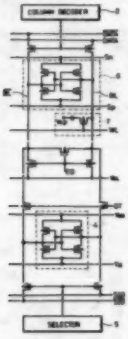
U.S. Cl. 365—189.05 **8 Claims**

7. In a method for writing data in a DRAM, including the steps of bringing a row address strobe input signal to an enabling state, changing a row address signal indicative of an address of a row for writing the data, enabling one of a plurality of word lines in accordance with the row address for writ-

ing the data, and activating a sense amplifier, the improvement comprising the steps of:

changing said address of a row for writing the data represented by said row address signal a plurality of times during a single enabled state of the row address strobe signal, and

maintaining data on bit lines throughout the enabled state of the row address strobe,



said step of maintaining said data on said bit lines including the steps of precharging said bit lines only once and changing signals applied to said word lines while said sense amplifier maintains said data on said bit lines,

thereby writing said data into a plurality of rows each having a different row address during a single enabled state of the row address input signal and increasing operational speed of the DRAM.

4,931,996

SEMICONDUCTOR MEMORY DEVICE

Hirofumi Yasuda, Suwa, Japan, assignor to Seiko Epson Corporation, Tokyo, Japan

Continuation of Ser. No. 114,311, Oct. 27, 1987, abandoned. This application Jun. 2, 1989, Ser. No. 360,611

Claims priority, application Japan, Oct. 27, 1986, 61-164538; Jun. 30, 1987, 62-163497

Int. Cl.[5] G11C *7/00*

U.S. Cl. 365—189.09 **45 Claims**

1. A semiconductor memory device for storing data and selecting data to be read by a sensing amplifier, comprising:

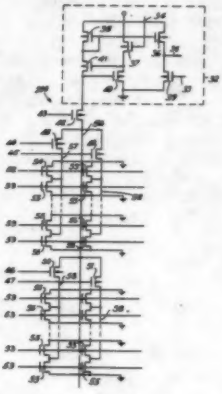
a plurality of memory cells for storing the data and arranged in a matrix, each memory cell including a MOS transistor having a source electrode and drain electrode;

word lines arranged in rows;

a plurality of first bit lines arranged in columns, each first bit line coupled to one of the source electrodes and drain electrodes of a plurality of MOS transistors wherein each column formed by said first bit lines includes at least two first bit lines and wherein the word lines and first bit lines are together operable for selecting one of the memory cells whereby the data stored in the selected memory cell serves as the selected data to be read by the sensing amplifier;

at least one second bit line, each at least one second bit line selectively coupled to said at least two first bit lines within the same column;

a power source line coupled to the other of the source electrodes and drain electrodes of a plurality of the MOS transitors; and



bit line select means for selectively coupling each second bit line to the sensing amplifier.

4,931,997

SEMICONDUCTOR MEMORY HAVING STORAGE BUFFER TO SAVE CONTROL DATA DURING BULK ERASE

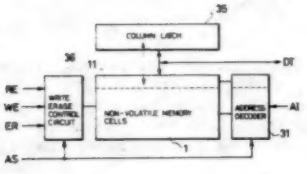
Naoki Mitsuishi; Kiyoshi Matsubara, both of Kodaira; Yoh Takamori, Kokubunji, and Yoshiyuki Ozawa, Fuchu, all of Japan, assignors to Hitachi Ltd., Tokyo, Japan

Filed Feb. 23, 1988, Ser. No. 159,193

Claims priority, application Japan, Mar. 16, 1987, 62-58808; Jun. 3, 1987, 62-139402

Int. Cl.[5] G11C *11/00*

U.S. Cl. 365—218 **18 Claims**



1. A non-volatile memory comprising:

a group of non-volatile memory cells having a predetermined memory cell rank containing protective information comprising control data indicative of a select set of the non-volatile memory cells not to be erased during an erasure mode;

a means for electrically writing and erasing data into and from said group of non-volatile memory cells including means for withholding erasure of the select set of non-volatile memory cells not to be erased, while erasing non-indicated memory cells; and,

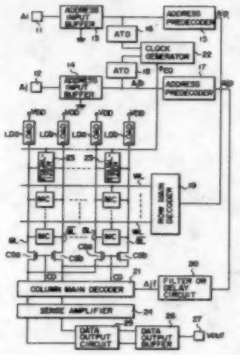
volatile storage means for storing the protective information prior to the erasure mode.

4,931,998

SEMICONDUCTOR MEMORY DEVICE WHICH CAN SUPPRESS OPERATION ERROR DUE TO POWER SUPPLY NOISE

Takayuki Ootani, and Masataka Matsui, both of Tokyo, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Feb. 15, 1989, Ser. No. 310,438
Claims priority, application Japan, Feb. 18, 1988, 63-35614
Int. Cl.[5] G11C *11/40*
U.S. Cl. 365—230.01 **19 Claims**



1. A semiconductor memory device comprising:
a memory cell array in which memory cells are arranged in a matrix form;
first address input means for receiving a row address signal;
second address input means for receiving a column address signal;
first decoder means for decoding an output signal from said first address input means, to select a row of said memory cell array;
filter means for receiving an output signal from said second address input means and eliminating a level change of the output signal during a predetermined period of time;
second decoder means for decoding an output from said filter means, to select a column of said memory cell array;
sense amplifier means for amplifying readout data from a memory cell selected in response to outputs from said first and second decoder means; and
output means for outputting a signal from said sense amplifier means.

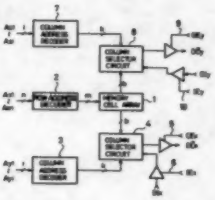
4,931,999

ACCESS CIRCUIT FOR A SEMICONDUCTOR MEMORY

Tsunenori Umeki, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed May 17, 1988, Ser. No. 194,707
Claims priority, application Japan, Jul. 27, 1987, 62-187948; Jul. 27, 1987, 62-187958
Int. Cl.[5] G11C *13/00*
U.S. Cl. 365—230.01 **8 Claims**

1. An access circuit for a semiconductor memory including a plurality of data storage locations disposed in rows and columns, comprising:
a memory cell array having a first and a second word line, each word line coupling a first and a second data storage location of a particular row to a first and a second column, respectively, when asserted;
a row address decoder, coupled to said memory cell array and responsive to a row address signal, for selecting said particular row by asserting a particular word line;
a first and a second substantially identical column selector circuit, coupled to said first and second columns of said memory cell, for independently selecting a particular one of said first and said second columns in response to a first column address signal received at said first column selector circuit and a second column address signal received at said second column selector circuit;
a first column address decoder, coupled to said first column selector and responsive to a first column address, for asserting said first column address signal to select said first column to access said first data storage location; and



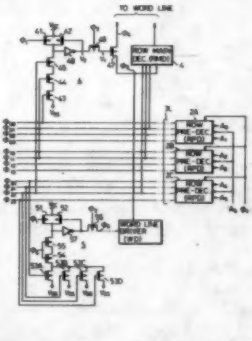
a second column address decoder, substantially identical to said first column address decoder and coupled to said second column selector, said second column address decoder responsive to a second column address independent from said first column address to assert said second column address signal to select said second column and thereby access said second data storage location in response to a second column address signal substantially with said assertion of said first column address signal.

4,932,000

SEMICONDUCTOR MEMORY DEVICE HAVING PSEUDO ROW DECODER

Yukinori Kodama, Yokohama, and Takaaki Furuyama, Kawasaki, both of Japan, assignors to Fujitsu Limited and Fujitsu Limited

Filed May 23, 1989, Ser. No. 355,630
Claims priority, application Japan, May 30, 1988, 63-130361
Int. Cl.[5] G11C *8/00*
U.S. Cl. 365—230.06 **12 Claims**



1. A semiconductor memory device comprising:
a memory cell array including a plurality of word lines;
a row pre-decoding means responsive to a row address signal, outputting a plurality of row pre-decode signals with units of a group having signals of a number corresponding to a combination of each logic level of a predetermined plurality of bits of said row address signal;
a row pre-decode wiring for transmitting said plurality of row pre-decode signals; and
a row main decoder responsive to one signal in each group

of said plurality of row pre-decode signals, carrying out a main decoding for selecting one of said plurality of word lines;

a pseudo row decoder having substantially same electrical characteristics as said row main decoder, carrying out a simulation of said main decoding in response to said plurality of row pre-decode signals output on said row pre-decode wiring; and

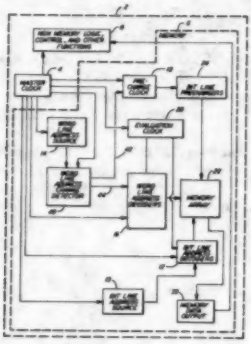
a word line driver for driving a word line selected by said row main decoder to a predetermined level, an operation of said word line driver being started in response to an activation of said pseudo row decoder.

4,932,001

REDUCING POWER CONSUMPTION IN ON-CHIP MEMORY DEVICES

David G. L. Chow, Austin, Tex., and Jack M. S. Liu, Tempe, Ariz., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Oct. 12, 1988, Ser. No. 256,682
Int. Cl.[5] G11C *7/00*
U.S. Cl. 365—233.5 **5 Claims**



1. In a power efficient semiconductor memory having word lines and bit lines adapted to be controlled in synchronism with successive clock cycles,

means defining respective word lines that are always in an activated state until a word line address change occurs,

pre-charging means for pre-charging the bit lines in each clock cycle,

a word line address source for supplying a word line address in each clock cycle,

word line address change detector means connected to the word line address source for generating an output responsive to detection of a change in word line addresses from one clock cycle to the next, and

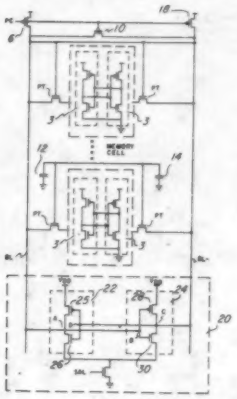
means responsive to the output of said detector means for disenabling the pre-charging means in all clock cycles except for those clock cycles when a word line address change occurs, whereby power is conserved by an activated word line which is activated until a word line address change occurs, and by the pre-charging of respective bit lines caused only in response to the detection of said word line address change.

4,932,002

BIT LINE LATCH SENSE AMP

Theodore W. Houston, Richardson, Tex., assignor to Texas Instruments, Incorporated, Dallas, Tex.

Filed Sep. 30, 1988, Ser. No. 252,287
Int. Cl.[5] G11C *13/00*
U.S. Cl. 365—241 **10 Claims**



1. A memory sensing apparatus comprising:

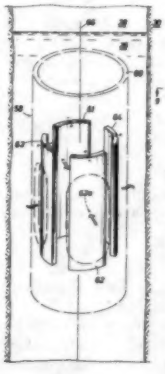
at least one sense amplifier including field effect transistors, a pair of bit lines, each bit line being connected to the drains of selected transistors of an associated at least one sense amplifier and being operable such that pre-charging of the bit lines also accomplishes pre-charging of the sense amplifier.

4,932,003

ACOUSTIC QUADRUPOLE SHEAR WAVE LOGGING DEVICE

Graham A. Winbow, Houston; Sen-Tsuen Chen, Sugar Land, and James A. Rice, Houston, all of Tex., assignors to Exxon Production Research Company, Houston, Tex.

Filed May 19, 1982, Ser. No. 379,684
Int. Cl.[5] G01V *1/40*
U.S. Cl. 367—75 **22 Claims**



1. A method of logging the earth surrounding a fluid-con-

taining well, including the steps of: determining the approximate range of shear wave velocities of the earth surrounding the fluid; generating in the fluid two positive pressure waves and two negative pressure waves, said pressure waves having a common component wave, so that the pressure waves will interfere and produce a quadrupole shear wave that will propagate along the well through the earth surrounding the well; detecting the arrival of the shear wave at a point spaced longitudinally along the well from the point of generation of the pressure waves; measuring the time lapse between the generation and the detection to determine the velocity of the shear wave through the earth; wherein the frequencies of the common component of the four pressure waves are in the frequency range corresponding to the approximate range of shear wave velocities of the earth surrounding the fluid in accordance with the table below:

Approximate Range of Shear Wave Velocities	Frequency Range of Overlapping Frequencies
5000–6000 ft/sec	(10/d)(3–14) KHz
6000–7000 ft/sec	(10/d)(3.5–18) KHz
7000–8000 ft/sec	(10/d)(3.7–21) KHz
8000–9000 ft/sec	(10/d)(4–25) KHz

where d is the borehole diameter in inches.

4,932,004

FIBER OPTIC SEISMIC SYSTEM

Henri Hodara, Altadena, and Steve W. Braun, San Diego, both of Calif., assignors to Honeywell Inc., Minneapolis, Minn.

Continuation of Ser. No. 833,516, Feb. 21, 1986, abandoned, which is a continuation of Ser. No. 436,279, Oct. 25, 1982, abandoned. This application Dec. 23, 1987, Ser. No. 140,919

Int. Cl.[5] G01V *1/00*

U.S. Cl. 367—76 **10 Claims**

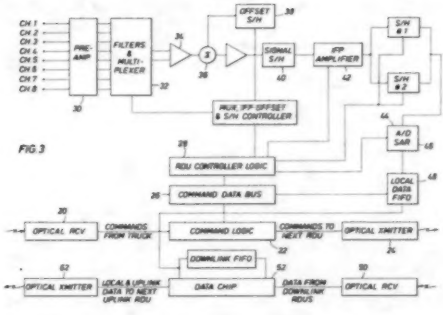


FIG. 3

1. A distributed geophone data acquisition system including a plurality of geophones, said system comprising:

control means for receiving data from said geophones, and for generating optical control signals for said system;

a plurality of data cables, wherein each of said cables includes two fiber optic light guides and a plurality of twisted pairs of electrical conductor channels;

a plurality of electrical conductor takeouts, wherein each of said takeouts is connected to and between one of said channels in one of said data cables and at least one of said geophones;

a plurality of remote data units for receiving electrical data signals from said geophones and said optical controls signals from said control means, and for transmitting geophone data and said optical control signals along said cables, wherein said remote data units are connected in series with one of said data cables connected between each pair of adjacent remote data units and another one of said data cables connected between one of said remote data units and said control means, wherein none of said data cables is directly connected to more than two remote data units, wherein each of said remote data units includes means for converting said electrical data signals to optical data signals and means for converting said optical control signals to electrical control signals, wherein each of said data cables is connected so that one of said two fiber optic light guides will transmit said optical control signals but will not transmit said optical data signals, and the other of said two fiber optic light guides will transmit said optical data signals but will not transmit said optical control signals and wherein the simultaneous, bidirectional transmission of said optical control signals and said optical data signals can occur through said data cables.

4,932,005

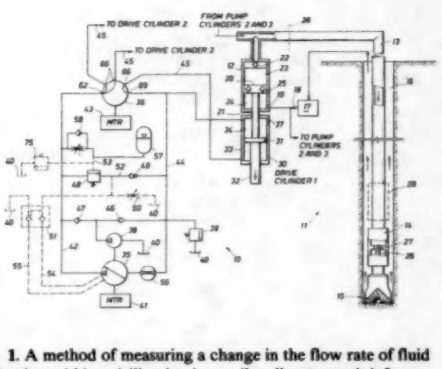
FLUID MEANS FOR DATA TRANSMISSION

J. C. Birdwell, 8535 Glencrest, Houston, Tex. 77061

Continuation of Ser. No. 762,426, Aug. 5, 1985, abandoned, which is a continuation-in-part of Ser. No. 220,527, Dec. 29, 1980, abandoned, which is a continuation-in-part of Ser. No. 455,509, Jan. 4, 1983, Pat. No. 4,541,779, which is a continuation-in-part of Ser. No. 529,487, Sep. 6, 1983, Pat. No. 4,611,973, which is a continuation-in-part of Ser. No. 680,849, Dec. 12, 1984, abandoned, which is a continuation-in-part of Ser. No. 692,319, Jan. 16, 1985, Pat. No. 4,676,724. This application Sep. 22, 1988, Ser. No. 173,197

Int. Cl.[5] G01V *1/40*

U.S. Cl. 367—83 **12 Claims**



1. A method of measuring a change in the flow rate of fluid flowing within a drill string in an oil well to transmit information concerning changes in downhole conditions from the bottom of the well to the top of the drill string, the method comprising the steps of:

(a) entrapping a first fluid within a closed container being provided with an escape outlet which outlet restricts fluid flow of the first fluid from said container;

(b) applying a pressure of constant magnitude to the entrapped first fluid;

(c) adding a controlled volume of fluid to the entrapped first fluid at a flow rate and pressure equal to the flow rate and pressure of the first fluid that flows through said escape outlet; and

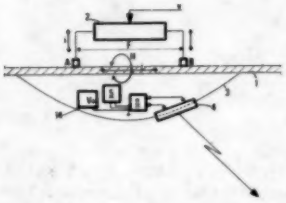
(d) measuring changes in the flow rate of the first fluid added to the entrapped first fluid to thereby measure any changes in the flow rate of said entrapped first fluid flowing out of the escape outlet.

4,932,006

PROCESS FOR SIGNAL TRANSMISSION WITHOUT ELECTRIC CONNECTION THROUGH A CONDUCTING WALL, THE HULL OF A SHIP FOR EXAMPLE, AND A DEVICE FOR IMPLEMENTING SAME

Robert Deligniéres, Marell Marly, France, assignor to Institut Francais du Petrole, Rueil-Malmaison, France

Filed Mar. 21, 1984, Ser. No. 591,963
Claims priority, application France, Mar. 28, 1983, 83/05185
Int. Cl.[5] H04B *11/00*
U.S. Cl. 367—134 8 Claims



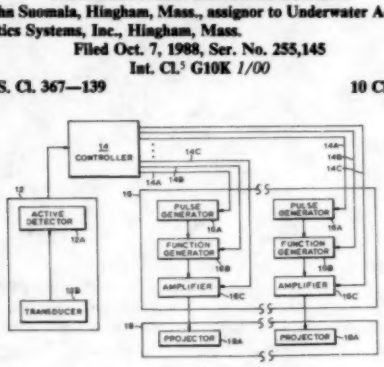
1. A process for transmitting a variable amplitude signal through the hull of a ship without piercing the hull to effect electrical connection therethrough, comprising generating, on one side of the hull, an electric current whose intensity is proportional to the amplitude of the signal to be transmitted; applying the generated current to the hull inside the ship between distinct locations thereon; detecting, on the other side of the hull, the magnetic field generated by the flow of the current between the distinct locations on the hull; and generating a signal on said other side of the hull which is proportional to the amplitude of said detected magnetic field.

4,932,007

FISH BEHAVIOR CONTROL SYSTEM

John Suomala, Hingham, Mass., assignor to Underwater Acoustics Systems, Inc., Hingham, Mass.

Filed Oct. 7, 1988, Ser. No. 255,145
Int. Cl.[5] G10K *1/00*
U.S. Cl. 367—139 10 Claims



1. The method of modifying the behavior of fish comprising the steps of:

A. detecting approaching fish;

B. generating sounds and projecting said sounds into the water;

C. monitoring the response of the fish to said projected sounds;

D. i. if the fish respond as desired, continuing to project the same sounds for a predetermined period of time, or ii. if the fish do not respond as desired, altering the sounds projected until the fish do so respond and projecting these sounds for a predetermined period of time; and

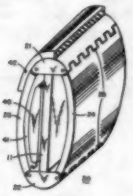
E. repeating steps A–D.

4,932,008

HINGE-MODIFIED FLEXTENSIONAL TRANSDUCER

Kenneth D. Rolt, Arlington, Mass., assignor to Raytheon Company, Lexington, Mass.

Continuation of Ser. No. 252,990, Oct. 4, 1988, abandoned. This application Sep. 19, 1989, Ser. No. 411,182
Int. Cl.[5] H04R *17/00*
U.S. Cl. 367—165 13 Claims



1. A flextensional electroacoustic transducer comprising:

a resilient housing having a plurality of shells each having opposite ends;

a transduction drive means within said housing;

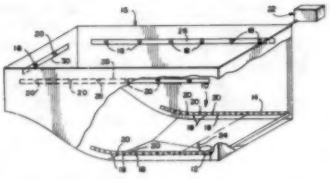
a plurality of mating rotation-type hinge means for securing each end of the drive means to each end of each of the plurality of shells, said hinge means providing only a single pivot point for the movement of each end of each of the plurality of shells wherein said drive means comprises: a transduction drive member having opposite ends; end members in contact with said drive member ends, each said end member providing a first portion of each one of the plurality of said hinge means and each of said ends of the plurality of shells providing a second portion of each one of the plurality of said hinge means, with said single pivot point provided by the interconnection of said first and second portions.

4,932,009

APPARATUS AND METHOD FOR DETECTING SWIMMERS

Thomas E. Lynch, Gates Mills, Ohio, assignor to Sonar International, Inc., Arlington, Va.

Continuation-in-part of Ser. No. 249,980, Sep. 27, 1988, abandoned. This application Mar. 10, 1989, Ser. No. 321,774
Int. Cl.[5] H04R *1/02;* H04B *1/06*
U.S. Cl. 367—153 29 Claims



1. An apparatus for detecting the presence of a person in a body of water comprising:

a plurality of pairs of transducers, each pair including a transmitting transducer for launching ultrasonic waves in a body of water in response to application of an excitation signal and a receiving transducer for receiving ultrasonic waves and for generating a reception signal indicative of receipt of ultrasonic waves, the transducers in each pair being disposed for the launching and reception of ultra-

sonic waves by and between them, each transducer pair defining a channel, the plurality of transducer pairs defining a corridor;

means for repeatedly applying a pulsed excitation signal to the transmitting transducer of a first of the channels in a corridor;

means for sequentially transferring the excitation signal to a transmitting transducer of a second through a last of the channels in the corridor upon generation of a reception signal by the receiving transducers of said first through the channel immediately preceding the last channel in the corridor, respectively, and for transferring the excitation signal to an alarm means upon the generation of a reception signal by the receiving transducer in the last channel, a person disposed in the body of water in one of the channels inhibiting generation of a reception signal by the receiving transducer in that channel and thereby preventing further transfer of the excitation signal; and

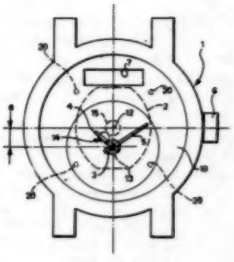
alarm means responsive to the receiving transducer in the last channel for indicating a failure by at least one of said receiving transducers to generate a reception signal in response to the excitation signal.

4,932,010

TIMEPIECE WITH AN ECCENTRIC DISPLAY MODULE

Norberto Perucchi, Ntel, Switzerland, assignor to Gianni Bulgari S.p.A., Rome, Italy

Filed Jul. 31, 1989, Ser. No. 387,042
Claims priority, application Italy, Aug. 4, 1988, 67739 A/88
Int. Cl.[5] G04B *19/04, 37/00*
U.S. Cl. 368—80 **1 Claim**



1. A timepiece comprising a case having a central axis,

a clock movement mounted in said case and having an output shaft defining a clock movement axis with said clock movement axis coinciding with said central axis of the case,

a display module independent of said case and said clock movement for displaying time, said display module including at least one rotary member rotatable about an axis of said display module,

coupling means symmetrically disposed about said central axis of said case for connecting said display module to said case in a selected one of a plurality of eccentric positions with the axis of said display module offset from said clock movement axis, and

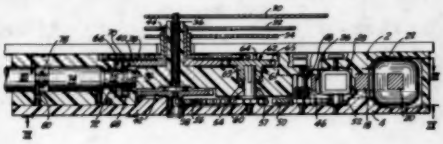
drive means operatively connecting said output shaft to said rotary member of said display module.

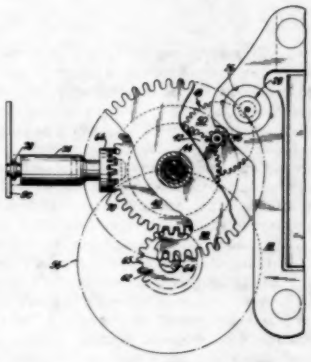
4,932,011

THREE HAND MOVEMENT FOR A TIMEPIECE WITH IMPROVED TIMESETTING GEAR TRAIN

Herbert Schwartz, Wurmberg, Fed. Rep. of Germany, assignor to Timex Corporation, Waterbury, Conn.

Filed Nov. 6, 1989, Ser. No. 432,016
Int. Cl.[5] G04B *17/12, 27/02*
U.S. Cl. 368—185 **7 Claims**





1. An improved movement for a three hand quartz analog timepiece having a frame member, a stepping motor with a rotor pinion adapted to periodically rotate half a revolution, and a plurality of coaxial output members rotatably mounted in said frame member, said coaxial output members including a seconds spindle adapted to receive a "seconds" hand and having a toothed seconds wheel and a reduction drive pinion connected thereto, said seconds wheel adapted to be driven via an intermediate reduction gear by said rotor pinion, a minutes sleeve adapted to receive a "minutes" hand and having a toothed minutes wheel connected thereto, and an hours sleeve adapted to receive an "hours" hand and having a toothed hours wheel connected thereto, wherein said improvement comprises;

a dual reduction gear assembly rotatably mounted in said frame member, said assembly comprising a first rotatable member including a toothed wheel meshing with and driven by said reduction drive pinion, and a second rotatable member including a first reduction pinion meshing with said hours wheel and a second reduction pinion meshing with said minutes wheel,

means for frictionally coupling said first and second rotatable members of the dual reduction gear assembly, whereby said reduction drive pinion directly drives both the minutes wheel and hours wheel through said dual reduction gear assembly during normal timekeeping, and

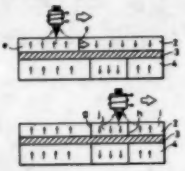
means for manually rotating said minutes wheel to set the time while preventing rotation of said first rotatable member, whereby said second rotatable member acts as a reduction gear between the hours and minutes wheel during time setting.

4,932,012

METHOD FOR REGENERATING INFORMATION FROM A MAGNETO-OPTICAL INFORMATION RECORDING MEDIUM

Tadashi Kobayashi, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 938,285, Dec. 5, 1986, abandoned. This application Jan. 20, 1988, Ser. No. 147,075
Claims priority, application Japan, Dec. 9, 1985, 60-275117
Int. Cl.[5] G11B *11/12, 13/04*
U.S. Cl. 369—13 4 Claims



1. Process for reproducing information comprising:

(a) Recording information on a magnetooptic recording medium having at least a recording layer and a reading layer both composed of a magnetic layers showing a vertical magnetic anisotropy, wherein said recording layer has a higher coercive force at room temperature and a lower Curie temperature than that of said reading layer, said recording layer being magnetized in a first direction a magnetic domain magnetized in a second direction, which is opposite to said first direction, such that the magnetic domain in said recording layer is not perfectly transferred to said reading layer and a floating magnetic field emanating from the magnetic domain in the recording layer which shows a distribution with negative and positive dual peak values in said reading layer in the vicinity of a boundary of said magnetic domain;

(b) irradiating said reading layer with a reproducing light while applying to said reading layer a magnetic field oriented in said first direction, said magnetic field having a magnitude larger than the coercive force of said reading layer, smaller than one of the peak values of said floating magnetic field; and

(c) detecting said reproducing light whose polarization has been modulated according to the direction of magnetization of said reading layer, to reproduce said recorded information.

4,932,013

APPARATUS FOR READING AN OPTICAL DISK WHICH CONTROLS TRACK JUMPING ACCURATELY AND STABLY

Kunio Kojima, Nara; Noriaki Sakamoto, Kyoto; Toshihisa Deguchi, Nara, and Daiji Yamane, Yamatokohriyama, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Apr. 28, 1988, Ser. No. 187,298
Claims priority, application Japan, Apr. 28, 1987, 62-107106
Int. Cl.[5] G11B *7/085, 21/08*
U.S. Cl. 369—32 10 Claims

1. An apparatus for reading an optical disk having tracks extending tangentially using light spots, comprising:

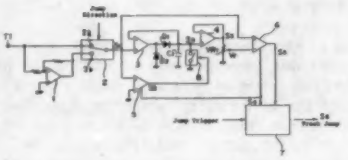
driving means for moving at least one light spot;

first circuit means for producing a tracking error signal representing a deviation between a position of said light spot and one of said tracks; and

second circuit means for producing an acceleration signal and a deceleration signal, said acceleration signal controlling said driving means to accelerate the movement of said light spot, said deceleration signal controlling said driving means to decelerate the movement of said light spot;

said driving means accomplishing a track jump of said light spot in accordance with said acceleration and deceleration signals;

said second circuit means producing said acceleration signal



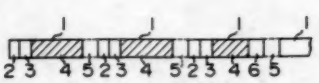
when said track jump is to be initiated and producing said deceleration signal when a ratio of a present level of said tracking error signal to a peak value of said tracking error signal becomes equal to a predetermined value.

4,932,014

DATA RECORDING AND READING SYSTEM

Toshihiko Tamiya, Hadano, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 8, 1988, Ser. No. 153,200
Claims priority, application Japan, Feb. 12, 1987, 62-28112
Int. Cl.[5] G11B *15/52*
U.S. Cl. 369—48 18 Claims



1. A data recording system for recording data blocks having a variable length in recording units each having a fixed length, comprising:

a recording medium having a plurality of fixed length recording units each composed of at least one data field in which data is recorded and an associated data recording information field in which data recording information is recorded; and

means for recording data in the data field and associated data recording information in the data recording information field of a fixed length recording unit;

wherein said data recording information comprises:

a data flag indicating if data has been recorded in said recording unit; and

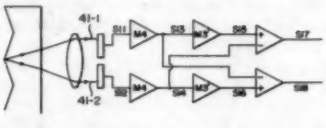
a data length field, separate from said data flag, indicating in length units the length of data forming a data block or a portion of a data block recorded in said recording unit.

4,932,015

METHOD OF REPRODUCING SIGNALS FROM OPTICAL DISK

Michiyoshi Nagashima, Hirakata, and Yoshinari Takemura, Osaka, both of Japan, assignors to Matsushita Electric Corp., Ltd., Osaka, Japan

Filed May 18, 1987, Ser. No. 50,427
Claims priority, application Japan, May 20, 1986, 61-115256
Int. Cl.[5] G11B *7/00*
U.S. Cl. 369—44.11 1 Claim



1. A method of reproducing, with reduced cross-talk, information signals which are recorded on an optical disk with a

track groove having a V-shaped radial section defined by opposing slant surfaces, each of said slant surfaces carrying a respective information signal recorded therein, the reproduction being conducted by focusing a laser beam spot on said track groove in said optical disk and receiving a reflected beam by a photodetector, said method comprising the steps of:

focusing said laser beam spot on the crest or valley of a track groove;

receiving the reflected beam by first and second photodetector units;

amplifying outputs of said first and second photodetector units in respective first and second amplifying circuits;

determining a first reproduced information signal having reduced cross-talk for one of the slant surfaces of said groove by subtracting, from a signal obtained by amplifying the output of said first photodetector unit in said first amplifying circuit with a first amplification factor, a signal obtained by amplifying the output of said second photodetector unit in said second amplifying circuit with a second amplification factor, said first amplification factor being greater than said second amplification factor; and

determining a second reproduced information signal having reduced cross-talk for the other slant surface of said groove by subtracting, from a signal obtained by amplifying the output of said second photodetector unit in said second amplifying circuit with a third amplification factor, a signal obtained by amplifying the output of said first photodetector unit in said first amplifying circuit with a fourth amplification factor, the third amplification being greater than said fourth amplification factor;

whereby recorded information signals having reduced cross-talk are simultaneously and independently reproduced from adjacent slant surfaces of a groove by a single laser beam spot.

4,932,016

APPARATUS AND METHOD OF RECORDING AND REPRODUCING DATA USING A DISK

Tadao Yoshida, Kanagawa; Kazuhiko Fujiie, and Ryo Ando, both of Tokyo, all of Japan, assignors to Sony Corporation, Tokyo, Japan

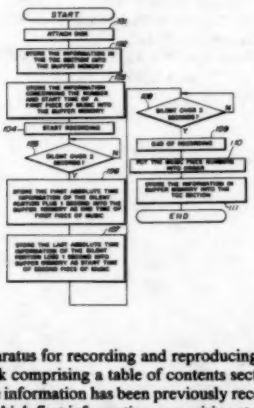
PCT No. PCT/JP87/00764, § 371 Date Jun. 2, 1988, § 102(e) Date Jun. 2, 1988, PCT Pub. No. WO88/02917, PCT Pub. Date Apr. 21, 1988

PCT Filed Oct. 12, 1987, Ser. No. 206,857

Claims priority, application Japan, Oct. 16, 1986, 61-246141

Int. Cl.[5] G11B *5/09*; H04N *5/76*

U.S. Cl. 369—48 **8 Claims**


START
ATTACH DISK
STORE THE INFORMATION IN THE TOC SECTION INTO THE BUFFER MEMORY
STORE THE INFORMATION OF THE SILENT SECTION AND THE START TIME OF A FIRST PIECE OF A MUSIC INTO THE BUFFER MEMORY
START RECORDING
SILENT OVER 3 SECONDS ?
END OF RECORDING
PUT THE MUSIC PIECE NUMBER INTO ERROR
STORE THE FIRST ABSOLUTE TIME INFORMATION OF THE SILENT SECTION (USE 1 SECOND BUFFER) INTO BUFFER MEMORY AS START TIME OF FIRST PIECE OF MUSIC
STORE THE INFORMATION IN BUFFER MEMORY INTO THE TOC SECTION
END
STORE THE LAST ABSOLUTE TIME INFORMATION OF THE SILENT SECTION (USE 1 SECOND BUFF) INTO BUFFER MEMORY AS START TIME OF SECOND PIECE OF MUSIC

1. An apparatus for recording and reproducing data using a disk, said disk comprising a table of contents section in which absolute time information has been previously recorded on said disk and in which first information comprising start time information indicating the numbers and start times of second information may be recorded, said start times being based upon said absolute time information, said disk further comprising a data recording region in which said second information having active and silent portions, such as musical performance information, can be recorded, said apparatus comprising:

memory means for storing reproduced first information;

reproducing means for reproducing said first information already recorded in said table of contents section and transcribing said reproduced first information into a memory means in said apparatus upon attachment of said disk to said apparatus;

first writing means for writing said first information into said memory means when recording said second information on said disk; and

recording means for recording said first information stored in said memory means in said table of contents section of the disk after termination of said recording and before taking out said disk.

4,932,017

METHOD AND APPARATUS FOR READING AND WRITING INFORMATION ON A RECORDING MEDIUM

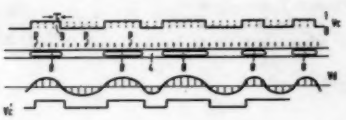
Cornelis M. J. Van Uijen, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed May 5, 1988, Ser. No. 190,548

Claims priority, application Netherlands, Dec. 3, 1987, 8702904

Int. Cl.[5] G11B *7/00*

U.S. Cl. 369—48 **12 Claims**



2. A method as claimed in claim 1, characterized in that the track is provided with preformed optically detectable control symbols which can be distinguished from the pattern of recording marks to be formed for providing control information, the reference marks being provided at predetermined positions relative to the control symbols.

4,932,018

INTEGRATED CIRCUIT FOR GENERATING INDEXING DATA IN A CD PLAYER

Naobumi Nagasawa, Ooizumi; Teruo Houshi, Oota, and Hiroyuki Arai, Ooizumi, all of Japan, assignors to Sanyo Electric Co., Ltd., Osaka, Japan

Filed Nov. 14, 1988, Ser. No. 271,041

Claims priority, application Japan, Nov. 19, 1987, 62-292434; Nov. 19, 1987, 62-292435; Nov. 19, 1987, 62-293436; Nov. 19, 1987, 62-293437

Int. Cl.[5] G11B *7/00*

U.S. Cl. 369—59 **6 Claims**

1. For a CD player connected to an external circuit, an integrated circuit, comprising:

an EFM decoder for converting an EFM signal read from a compact disc into symbols each of which is 8 bits;

a first shift register for storing subcodes outputted from said EFM decoder;

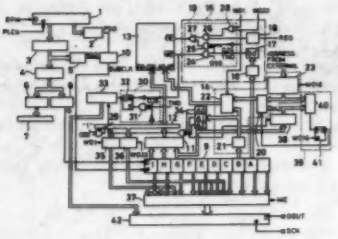
a memory circuit which is connected to said first shift register through a data bus to store data recorded in a first subcode area of said register;

an R/W control circuit for controlling writing and reading of said memory circuit in accordance with data recorded in a second subcode area of said register and a signal applied from the external circuit;

an address control circuit for applying data recorded in a third subcode area of said register and address data from

the external circuit to said memory circuit as a writing address and a reading address, respectively;

a selector for selectively outputting data read from said memory circuit and subcode data stored in said first shift register; and



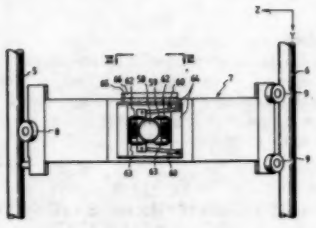
a second shift register for receiving an output of said selector and sending inputted data to the external circuit in response to a clock.

4,932,019

DISK PLAYER HAVING A VIBRATION DISSIPATING DEVICE

Akira Bessho, Saitama, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Nov. 16, 1988, Ser. No. 271,990
Claims priority, application Japan, Mar. 4, 1988, 63-28785
Int. Cl.[5] G11B *21/10, 21/16*
U.S. Cl. 369—247 **3 Claims**



1. A disk player having a vibration absorbing member for dissipating resonance, said disk player comprising:

a plurality of optical elements including a light emitting element, and an objective lens for focusing a light beam emitted from said light emitting element on the recording surface of a recording medium;

a servo-drive mechanism for servo-driving said objective lens;

a holding member for holding at least said objective lens and servo drive mechanism;

a supporting mechanism supporting said holding member in such a manner that said holding member is movable along said recording surface, said supporting mechanism having a pair of guide members which movably support said holding member at both ends thereof;

drive means for moving said holding member;

at least one weight secured to said holding member; and

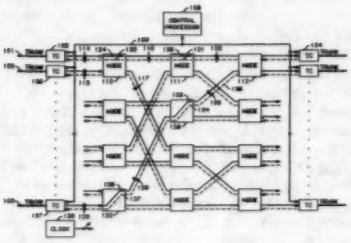
a vibration absorbing member interposed between said holding member and said weight wherein any resonance energy created by movement of said holding member is dissipated by said weight and said vibration absorbing member, wherein said weight is bonded to a surface of said holding member which is perpendicular to the direction of movement of said holding member.

4,932,020

PACKET SWITCHING ARRANGEMENT INCLUDING PACKET RETRANSMISSION

Mark A. Pashan, and Avinash K. Vaidya, both of Naperville, Ill., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Nov. 14, 1988, Ser. No. 270,725
Int. Cl.[5] H04L *1/16*
U.S. Cl. 370—14 **18 Claims**



1. A packet switching arrangement comprising:

input means for transmitting a packet including routing information;

a first switching node connected to said input means for receiving said packet and in response to said routing information for connecting said packet to a second switching node via a packet path and for completing a control path from said second switching node to said input means; and

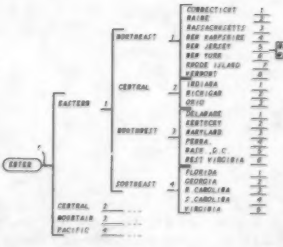
said second switching node comprises means for determining when said packet is unusable, means responsive to a determining of an unusable packet for transmitting a control signal to said input means via said control path from said second switching node to said input means, means responsive to said determining means for marking said packet unusable and means for transmitting said packet including said unusable marking to an output port of said second switching node.

4,932,021

PATH LEARNING FEATURE FOR AN AUTOMATED TELEMARKETING SYSTEM

Taryn S. Moody, Eatontown, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Apr. 3, 1989, Ser. No. 332,066
Int. Cl.[5] H04L *11/00*
U.S. Cl. 370—54 **8 Claims**



1. Apparatus for use in a system of the kind which establishes a path from a common point to a desired service offering based

on a user of said system entering a sequence of characters identifying said path, said path being one of a plurality of paths contained within said system, said apparatus comprising

means responsive to receipt of each of said sequence of characters for storing said characters in the order that they are received in a record associated with said user, each character of said stored sequence of characters being associated with a respective weight,

means for advancing said user to an end point of said one path as identified by the received sequence of characters, and

means thereafter operative each time said user subsequently accesses said system for extending to said user an option to advance to the end point of said one path when the weight of each character of said sequence at least equals the value of a respective threshold as a result of said user's pattern of past usage of said system.

4,932,022

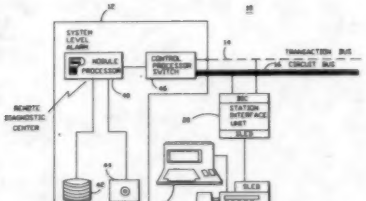
INTEGRATED VOICE AND DATA TELEPHONE SYSTEM

Clare G. Keeney, Campbell; Gary L. Passon, Los Gatos; Ronald J. Hagen, Livermore; Chris D. Foster, and Frank J. Fritsch, both of Sunnyvale, all of Calif., assignors to Telenova, Inc., Los Gatos, Calif.

Continuation of Ser. No. 107,863, Oct. 7, 1987, abandoned, which is a continuation of Ser. No. 675,422, Nov. 27, 1984, abandoned. This application Mar. 20, 1989, Ser. No. 326,405

Int. Cl.[5] H04J *3/24*

U.S. Cl. 370—60 **14 Claims**



1. A telephone station set for use in a business communication system, said telephone station set comprising

means connected in common to a pair of telephone subscriber lines for transmitting and receiving simultaneous multiplexed digital voice and data information only on said subscriber lines to thereby permit simultaneous voice and data communication,

softkey-selectible menu-driven display means for displaying a plurality of interactive changeable functions,

means responsive to a soft key-selected one of said displayed menu functinos for enabling said selected menu function, said display means including a first display portion for displaying a first line of characters identifying information and prompts relating to a particular telephone call and a second different display portion for displaying a second line of characters representative of a plurality of changeable menu functions, each of which correspond to a particular selected one of said softkey function keys during a respective stage of the particular telephone call.

4,932,023

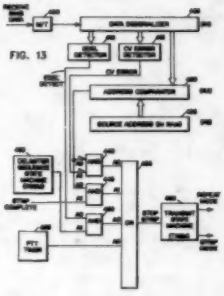
FRAME STRIPPING PROTOCOL FOR EARLY TOKEN RELEASE IN A RING COMMUNICATION NETWORK

Joel Erwin Geyer, Cary; Joseph K. Lee, Raleigh; Vernon R. Norman, Cary, and Kenneth T. Wilson, Raleigh, all of N.C., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 20, 1989, Ser. No. 368,739

Int. Cl.[5] H04J *3/16*

U.S. Cl. 370—85.4 **31 Claims**



12. A method for removing corrupted messages from a communication network wherein each corrupted message is characterized in that at least a part of the message has been damaged before being removed from the network comprising the steps of:

generating a formatted message having a phYsical header, a data field, and a physical trailer at an originating station;

transmitting the formatted message onto the network;

transmitting a first predetermined bit pattern followed by the release of the token onto the network at the originating station;

activating a message stripping mode at the originating station; and

receiving, examining and removing received messages from the network until a strip termination condition for corrupted messages is detected.

4,932,024

SYSTEM FOR AUTOMATIC CONTROL OF DEVICES, APPARATA AND PERIPHERAL UNITS FOR SIGNAL SWITCHING AND PROCESSING

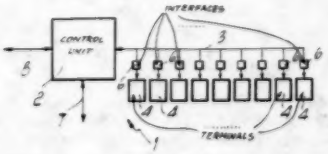
Paolo Bonicioli; Gianbattista Carminati, and Giorgio Buonfiglioli, all of Milan, Italy, assignors to Etefin S.p.A., Vimodrone Mi, Italy

Filed Feb. 17, 1988, Ser. No. 156,853

Claims priority, application Italy, Feb. 27, 1987, 19528 A/87

Int. Cl.[5] H04J *3/02*

U.S. Cl. 370—85.9 **33 Claims**



1. A system for automatic control of devices, apparatus and peripheral units for signal switching and processing as phone, data and image digitized signals, comprising a single central control unit for controlling a plurality of terminals including

telephone sets and/or peripherals and/or other numerically controllable actuator devices, said plurality of terminals being connected to said central control unit through two-wire internal digital lines, said internal digital lines defining each a time sharing transmission channel, divided into a plurality of time slots, each said terminal being fixedly associated to at least one preset time slot, wherein said internal digital lines are connected to a plurality of terminal interfaces, each connected to a respective terminal, for receiving signals sent on said internal digital lines toward said respective terminal and transmitting on said internal digital lines signals arriving from said respective terminal in preset time intervals, each said terminal interface comprising a local oscillator driving a phase lock circuit and a time slot/frame selection circuit, said selection circuit being furthermore controlled by said phase lock circuit and by a control processor, a transmission and reception section being furthermore connected to said internal digital lines and to the respective terminal and being driven by said selection circuit and by said control processor for data and signaling exchange.

4,932,025

METHOD OF INFORMATION TRANSFER AS WELL AS AN ARRANGEMENT FOR IMPLEMENTING THE METHOD

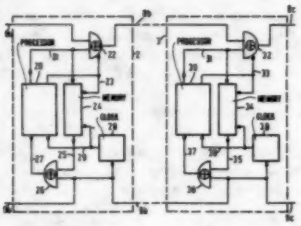
Ernst Metzler, Bremerhaven-W., Fed. Rep. of Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 26, 1988, Ser. No. 263,099

Claims priority, application Fed. Rep. of Germany, Oct. 28, 1987, 3736466

Int. Cl.[5] H04J *3/02*

U.S. Cl. 370—85.15 **8 Claims**



1. A method for simultaneously transferring information through the same channel between two of two or more stations, which are all connected to each other for serial data transfer by means of a write line and a read line separated from the write line, the write line, after passing through all the stations, being connected to the read line at the end, comprising at each of these two stations: reversibly linking the information to be transferred with information arriving through an incoming write line; transferring the linked information through an outgoing write line; buffering the information to be transferred; and linking the information received through the read line to the buffered information, in order to receive the information to be transferred from the other station.

4,932,026

APPARATUS FOR DISTRIBUTING DATA PROCESSING ACROSS A PLURALITY OF LOCI OF CONTROL

Roger H. Dev, Hudson, N.H.; Gabriel Steinberg, Watertown; John B. Kam, Concord, both of Mass., and Stewart A. Comer, Hollis, N.H., assignors to Wang Laboratories, Inc., Lowell, Mass.

Filed Dec. 19, 1986, Ser. No. 944,500

Int. Cl.[5] H04J *3/24*

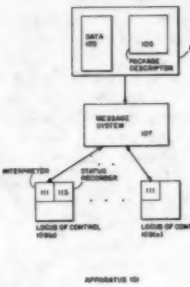
U.S. Cl. 370—94.1 **35 Claims**

1. In a digital data processing system having a first plurality of loci of control, apparatus for distributing the processing of data across the loci comprising:

(1) a package including

the data to be processed and

a processing descriptor associated with the data which specifies a second plurality of the first plurality of loci in



which the data is to be processed and how the data is to be processed in the second plurality of loci;

(2) a message system for providing the package to the second plurality of loci; and

(3) interpreter means in each locus of the second plurality of loci for processing the data by executing a portion of the processing descriptor specified for that locus.

4,932,027

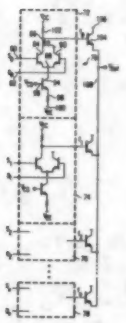
SINGLE-LEVEL MULTIPLEXER

Carl J. Scharrer, Plano, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Mar. 22, 1988, Ser. No. 171,617

Int. Cl.[5] H04J *3/04;* **H03K** *17/56, 17/40, 17/52*

U.S. Cl. 370—112 **18 Claims**



1. A single-level multiplexer having a plurality of stages, each stage comprising:

a select transistor having a current path and a control element for controlling the conductance of said current path, one end of said current path coupled to an output node, a second end of said current path coupled to a current source, said control element coupled to a select signal source;

a data transistor having a current path for selectively coupling a voltage reference to said current source, a control element of said data transistor coupled to a data signal source for controlling the conductance of said data transistor current path; and

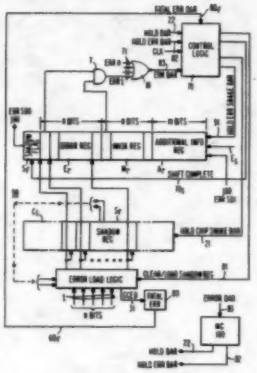
said output nodes of said stages coupled in common to an output of said multiplexer.

4,932,028

ERROR LOG SYSTEM FOR SELF-TESTING IN VERY LARGE SCALE INTEGRATED CIRCUIT (VLSI) UNITS

Haluk Katircioglu, Irvine; John A. De Beule, Rancho Santa Margarita; Debaditya Mukherjee, El Toro, and Gary C. Whitlock, Mission Viejo, all of Calif., assignors to Unisys Corporation, Blue Bell, Pa.

Filed Jun. 21, 1988, Ser. No. 209,664
Int. Cl.[5] G06F *11/00*
U.S. Cl. 371—16.5 **26 Claims**



1. A VLSI chip architecture having built-in self-test circuitry and concurrent error detection circuitry cooperating with error logging circuitry for reporting to a maintenance controller, comprising, in combination:

(a) functional logic circuitry connected as part of a shift chain of multifunction shift registers composed of flip-flop units;

(b) concurrent error detection circuitry (CED) connected to sense errors in said functional logic circuitry during normal chip operations;

(c) means, using said maintenance controller, to initialize said functional logic circuitry for normal chip operation; and including:

(c1) means to access said functional logic circuitry as a shift chain and to perform a shift operation for setting up an initial machine state in each said flip-flop unit;

(d) means, connected to said functional logic circuitry and to said concurrent error detection circuitry, to log and accumulate error-related information after initialization of normal chip operation.

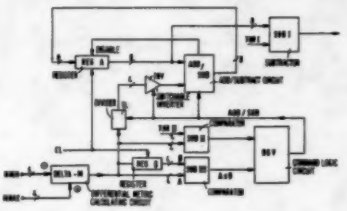
4,932,029

METHOD AND APPARATUS FOR CORRECTING ERRORS IN CONVOLUTIONAL CODE SIGNALS

Johannes Heichler, Murrhardt, Fed. Rep. of Germany, assignor to ANT Nachrichtentechnik GmbH, Backnang, Fed. Rep. of Germany

Filed Jul. 25, 1988, Ser. No. 223,948
Claims priority, application Fed. Rep. of Germany, Jul. 24, 1987, 3724537; Jul. 24, 1987, 3724536; Aug. 3, 1987, 3725655
Int. Cl.[5] G06F *11/00*
U.S. Cl. 371—43 **18 Claims**

3. A method as in claim 1, further comprising the steps of applying the control signals and demodulated n-PSK signal having phase ambiguities appearing at a carrier recovery of a demodulator, to a transformation network at a digital input of a convolution decoder and controlling the transformation



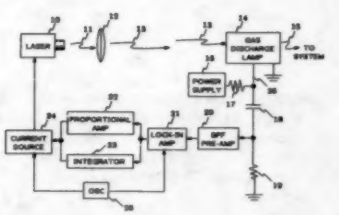
network with the control signals to cancel the phase ambiguity.

4,932,030

FREQUENCY STABILIZATION OF LONG WAVELENGTH SEMICONDUCTOR LASER VIA OPTOGALVANIC EFFECT

Yun C. Chung, Aberdeen, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jun. 5, 1989, Ser. No. 361,472
Int. Cl.[5] H01S *3/13*
U.S. Cl. 372—32 **5 Claims**



1. A stabilization arrangement for a semiconductor laser comprising:

a semiconductor laser for generating an optical signal having a nominal operating wavelength greater than 1.2 μm;

a gas discharge element for generating an optogalvanic signal at a predetermined wavelength corresponding to an atomic transition line of gas atoms in said gas discharge element in response to said optical signal, said gas atoms selected from the group consisting of noble gases, said nominal operating wavelength being substantially close to said predetermined wavelength;

feedback control means responsive to said optogalvanic signal for dynamically adjusting a characteristic of said semiconductor laser to stabilize said nominal operating wavelength of the semiconductor laser to be substantially equal to said predetermined wavelength.

4,932,031

CHROMIUM-DOPED FORESTERITE LASER SYSTEM

Robert R. Alfano, 3777 Independence Ave., Bronx, N.Y. 01463; Vladimir Petricevic, 547 Riverside Dr., New York, N.Y. 10027, and Swapan Gayen, 2112 Starting Ave., Apt. No. 6D, Bronx, N.Y. 10462

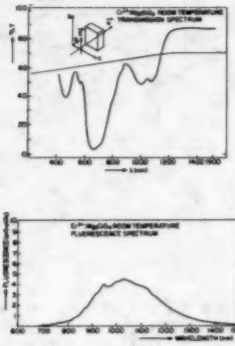
Continuation-in-part of Ser. No. 128,811, Dec. 4, 1987. This application Sep. 26, 1989, Ser. No. 248,749
Int. Cl.[5] H01S *3/16*
U.S. Cl. 372—41 **32 Claims**

1. A laser comprising:

a. a laser medium comprising a single crystal of forsterite

doped with tetravalent chromium ions and having a formula $CR^{+4}:Mg_2SiO_4$.

b. optical means for exciting said laser medium to emit coherent optical radiation, and



c. an optical resonant cavity for supporting coherent radiation emitted by the laser medium over a band between 1150, 850 and 1350 nanometers.

4,932,032

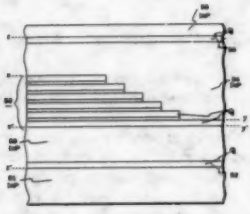
TAPERED SEMICONDUCTOR WAVEGUIDES

Thomas L. Koch, Holmdel, and Uziel Koren, Fair Haven, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Aug. 3, 1989, Ser. No. 389,087

Int. Cl.[5] H01S *3/19*

U.S. Cl. 372—45 **11 Claims**



6. A tapered waveguide having a propagation axis and a reference plane defined normal to said propagation axis, wherein the tapered waveguide comprises a plurality of guiding layers including a first semiconductor material, and a plurality of stop-etch layers including a second semiconductor material, said stop-etch layers arranged alternately with said guiding layers, and each guiding layer arranged to extend from said reference plane along said propagation axis further than said guiding layer immediately adjacent thereabove, a cladding region substantially surrounding exterior surfaces of said pluralities of guiding and stop-etch layers, said cladding region comprising third semiconductor material, said first semiconductor material having an index of refraction which is greater than an index of refraction for said third semiconductor material,

said cladding region further including means for controlling a predetermined characteristic of lightwave signals propagating along said tapered waveguide.

4,932,033

SEMICONDUCTOR LASER HAVING A LATERAL P-N JUNCTION UTILIZING INCLINED SURFACE AND METHOD OF MANUFACTURING SAME

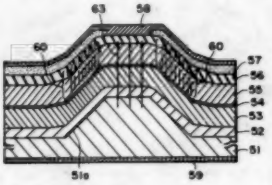
Seiichi Miyazawa, Sagamihara, and Mitsuru Ohtsuka, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 100,454, Sep. 24, 1987, abandoned. This application Nov. 17, 1988, Ser. No. 273,721

Claims priority, application Japan, Sep. 26, 1986, 61-229085; Feb. 6, 1987, 62-024871

Int. Cl.[5] H01S *3/19*

U.S. Cl. 372—46 **23 Claims**



1. A semiconductor laser having a laser resonator structure, comprising:

a substrate having a trapezoidal projection, said trapezoidal projection forming on both sides of an upper base an inclined surface extending along a resonating direction of a resonator;

a first semiconductor layer of a first or second conductivity type formed on said substrate;

an active layer formed on said substrate for generating a laser beam;

a second semiconductor layer which is formed on said substrate and to which an impurity of a convertible conductivity type is doped, a portion of said second semiconductor layer above the included surface of said substrate having the first conductivity type, and the other portion having the second conductivity type; and

a pair of electrodes causing a current to flow through said active layer;

wherein the laser beam is emitted from a region of said active layer on said upper base of said projection by causing said current to flow through said active layer.

4,932,034

DISTRIBUTED FEEDBACK SEMICONDUCTOR LASER DEVICE AND CURRENT INJECTION

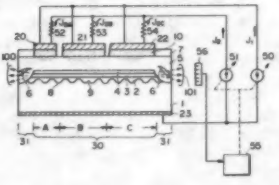
Masashi Usami; Shigeyuki Akiba, both of Tokyo, and Yuichi Matsushima, Tanashi, all of Japan, assignors to Kokusai Denshin Denwa Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 314,483, Feb. 23, 1989, abandoned. This application Sep. 27, 1989, Ser. No. 414,585

Claims priority, application Japan, Mar. 11, 1988, 63-56246

Int. Cl.[5] H01S *3/08, 3/19*

U.S. Cl. 372—96 **12 Claims**



1. A distributed feedback semiconductor laser device which

is provided with a diffraction grating provided near a light emitting active layer, a double hetero structure with the active layer sandwiched between n- and p-type semiconductors, and n- and p-side electrodes for injecting a current into the active layer, characterized by the provision of:

a first current source connected to each of electrodes into which one of the n- and p-side electrodes is divided; and

a second current source connected to the divided electrodes via resistors, for injecting a current into the active layer in a desired ratio;

the first and second current sources being controlled in accordance with the light emitting state of the active layer.

4,932,035

DISCONTINUOUS GLASS MELTING FURNACE

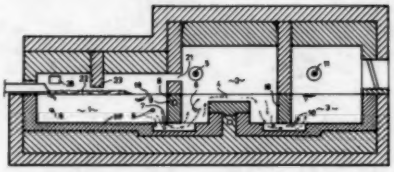
Helmut Pieper, Lohr/Main, Fed. Rep. of Germany, assignor to Sorg GmbH & Co. KG, Lohr/Main, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 195,514, May 18, 1988. This application Aug. 9, 1989, Ser. No. 391,443

Claims priority, application Fed. Rep. of Germany, Feb. 2, 1989, 3903016

Int. Cl.[5] C03B 5/027

U.S. Cl. 373—32 **10 Claims**



1. Glass melting furnace with a melting section in which batch is added to a molten glass bath, a homogenizing section, and a clarifying section therebetween in which burners for the input of fossil energy are disposed, and between the clarifying section and the melting section a first radiation shielding wall extending to just above the furnace bottom to form an underpass for flow of molten glass between said melting section and said clarifying section, the first radiation shielding wall having an opening for the passage of the combustion gases, said furnace further comprising a second radiation shielding wall disposed in the melting section and having a bottom margin, the opening in said first shielding wall having a bottom margin which is above the bottom margin of said second shielding wall.

4,932,036

SPREAD SPECTRUM SQUARING LOOP WITH INVALID PHASE MEASUREMENT REJECTION

Dhanvant H. Goradia, Charlottesville; Fred W. Phillips, and Gregory Schluge, both of Afton, all of Va., assignors to Sperry Marine Inc., Charlottesville, Va.

Filed Mar. 3, 1989, Ser. No. 318,583

Int. Cl.[5] H04K 1/00

U.S. Cl. 375—1 **11 Claims**

1. Phase detector apparatus for use in a phase locked loop for phase locking to a receive signal in a noisy environment, said receive signal being bi-phase modulated with data bits, comprising:

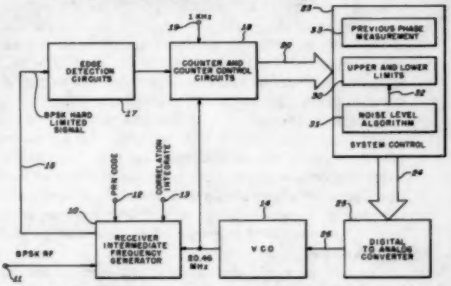
reference clock oscillator means for providing a reference clock signal with rising and falling edges,

means for down converting said receive signal to an I.F. signal,

means for hard limiting said I.F. signal to provide a hard limited I.F. signal with rising and falling edges and with extraneous or missing edges caused by said data bits,

means responsive to said reference clock signal and said hard limited I.F. signal for obtaining phase measurements between predetermined edges of said reference clock signal and said edges of said hard limited I.F. signal, thereby providing a phase measurement signal,

said phase measurement signal providing a phase locking error signal for said phase locked loop,



said extraneous or missing edges causing phase locking instability, and

phase evaluation means responsive to said phase measurement signal for removing phase measurements therefrom caused by said extraneous or missing edges that would result in said phase locking instability.

4,932,037

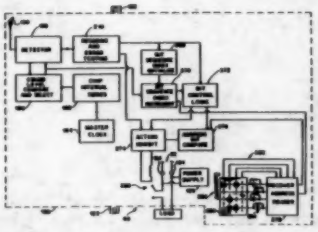
REMOTE CONTROL SYSTEM, COMPONENTS AND METHODS

Raymond W. Simpson, Hamilton Square; Donald G. Chandler, Pennington, and John Bowers, Monmouth Junction, all of N.J., assignors to Hillier Technologies Limited Partnership, Princeton, N.J.

Division of Ser. No. 13,577, Feb. 11, 1987, Pat. No. 4,864,588. This application Jul. 27, 1989, Ser. No. 386,583

Int. Cl.[5] H04L 9/00

U.S. Cl. 375—1 **19 Claims**



6. A spread spectrum method of communicating digital information comprising the steps of:

(a) timing predetermined transmitter chip intervals;

(b) during a preamble period, generating a preamble chip signal having either a first or second binary value during each of said transmitter chip intervals, generating a transmitter clock signal having a predetermined series of different values for different transmitter crumb intervals, each transmitter crumb interval being a rational fraction of one of said chip intervals, and impressing both said transmitter clock signal and said preamble signal on a predetermined parameter of a transmitted signal so that said predetermined parameter of said transmitted signal carries said preamble signal encoded with said transmitter clock signal;

(c) after said preamble period, transmitting said information as a stream of binary chip values impressed upon said predetermined parameter of said transmitted signal;

(d) detecting said transmitted signal at a receiver remote

from said transmitter and producing a detector signal representative of the value of said predetermined parameter in said transmitted signal;

(e) generating at said receiver plural separate sequences of chip intervals such that the duration of each said chip interval in each said sequence is equal to the duration of said transmitter chip intervals and so that said sequences of receiver chip intervals are offset in time from one another, and subdividing each chip interval in each of said separate sequences into receiver crumb intervals equal in duration to said transmitter crumb intervals;

(f) determining whether each of said separate series of receiver chip intervals satisfies the condition that the values of said detector signal for the crumb intervals in each chip interval match a template corresponding to said predetermined series of values in said transmitter clock signal, and selecting as a decoding sequence one of said separate series of receiver chip intervals which best satisfies said condition; and

(g) after said preamble period, assigning first or second binary values to said chip intervals in said decoding sequence within said receiver according to the value of said decoder signal during each said decoding chip interval, to thereby provide said decoding chip intervals with binary values corresponding to the binary values in said digital information.

4,932,038

PHASE MODULATOR CIRCUIT

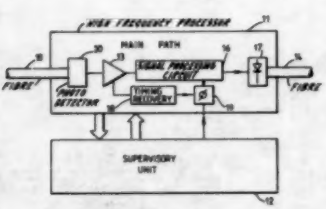
Geoffrey G. Windus, Chelmsford, Great Britain, assignor to STC PLC, London, England

Filed Oct. 26, 1988, Ser. No. 262,696

Claims priority, application United Kingdom, Nov. 18, 1987, 8726980

Int. Cl.[5] H04L 25/52

U.S. Cl. 375—4 **2 Claims**



1. A digital telecommunications repeater, including means for receiving a digital input pulse stream, a high frequency processor for regenerating said input digital pulse stream and providing a main signal path for said pulse stream, means for outputting said regenerated pulse sream, a timing recovery circuit arranged to generate sinusoidal clock signals at a frequency determined by the input signal baud rate, a phase modulator circuit whereby said clock signals are coupled to the main signal path, and a low frequency supervisory circuit associated with the high frequency processor and arranged to provide signals to the phase modulator whereby said sinusoidal clock signals are phase modulated, wherein the phase modulator circuit comprises first and second long tailed transistor pairs, the transistor base terminals of each pair providing inputs to which said clock signals are coupled, there being emitter resistors one for each said transistor, wherein said first and second long tailed transistor pairs provide each a collector load for a further long tailed transistor pair, the transistor emitters of said further pair being coupled to ground via respective further emitter resistors and a current source, and wherein said resistors are of substantially equal value (R), said value being given by the expression

$$I \times R = C$$

where I is the current, in milliamps, generated by the current source and C is a constant factor having a value in the range 50 to 80, the phase modulator being such that the phase modulated signal coupled to the main signal path is of substantially constant amplitude.

4,932,039

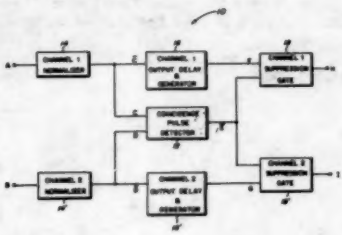
PULSE INTERFERENCE CANCELER OF HIGH POWER OUT-OF-BAND PULSE INTERFERENCE SIGNALS

Stanley K. Miyashiro; Francis E. Morris, and Albert T. Roome, all of San Diego, Calif., assignors to The United States of America as represented by the Secretary the Navy, Washington, D.C.

Filed Jun. 8, 1989, Ser. No. 364,048

Int. Cl.[5] H04B 1/10

U.S. Cl. 375—102 **30 Claims**



1. A communications device for cancelling pulse interference received by a multi-channelled receiver comprising:

pulse normalizers individual to said receiver channels and operably coupled thereto for normalizing pulses received on said receiver channels into normalized pulses of preselected pulse time widths;

a coincidence pulse detector operably coupled to said pulse normalizers for detecting simultaneous normalized pulses, said simultaneous normalized pulses corresponding to pulses received on two or more of said receiver channels; and

pulse suppressors individual to said receiver channels and operably coupled thereto and to said coincidence pulse detector for cancelling said pulses received on said two or more receiver channels when simultaneous normalized pulses are detected by said coincidence pulse detector.

4,932,040

BIDIRECTIONAL CONTROL SIGNALLING BUS INTERFACE APPARATUS FOR TRANSMITTING SIGNALS BETWEEN TWO BUS SYSTEMS

George J. Barlow, Tewksbury, Mass., assignor to Bull HN Information Systems Inc., Billerica, Mass.

Filed Dec. 7, 1987, Ser. No. 129,278

Int. Cl.[5] H04L 7/04

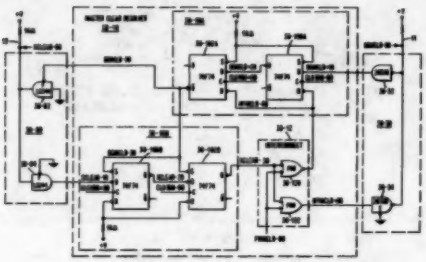
U.S. Cl. 375—111 **28 Claims**

1. Bidirectional control signalling resolver apparatus for transmitting control signals between a pair of independently operated bus systems, said apparatus comprising:

a pair of synchronizer devices, each device having a control signal input and a control signal output, said control signal input and output of a first synchronizer device being connected to a first and a second bus system of said pair of bus systems respectively, and said control signal input and output of a second synchronizer device being connected to said second and said first bus systems respectively, each of said synchronizer devices having series connected input and output stages connected to said control signal input and output respectively, each of said input and output

stages including a clock input, said input and output stages respectively of said first synchronizer device being connected to receive first and second complementary clock signals respectively generated at a predetermined rate and said input and output stages of said second synchronizer device being connected to receive said second and first complementary clock signals respectively; and

first means connecting said control signal output of one of said first and second synchronizer devices as an input to



said input and output stages of another one of said first and second synchronizer devices, said first means enabling only said one of said first and second synchronizer devices to retransmit said control signals received on said control signal input of said one synchronizer device from a corresponding one of said bus systems through said input and output stages to said control signal output of said one synchronizer device and to another one of said bus systems when control signals are concurrently generated on said first and second bus systems.

4,932,041

CIRCUIT FOR OBTAINING A BIT-RATE CLOCK SIGNAL FROM A SERIAL DIGITAL DATA SIGNAL

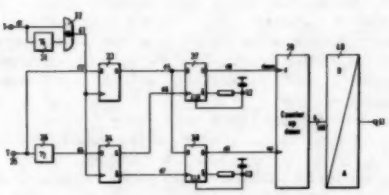
Berthold Eiberger; Michael Philipps, both of Darmstadt; Rolf Schiffmann, Mainz, and Peter Ries, Seeheim-Jugenheim, all of Fed. Rep. of Germany, assignors to BTS Broadcast Television Systems GmbH, Darmstadt

Filed Jul. 6, 1988, Ser. No. 215,742

Claims priority, application Fed. Rep. of Germany, Jul. 7, 1987, 3722328

Int. Cl.[5] **H03D** *3/24*

U.S. Cl. 375—120 **9 Claims**



1. Circuit for obtaining a bit-rate clock signal from a digital data signal, including a phase locked loop circuit comprising a phase comparison circuit, a low-pass filter and a controllable oscillator, said digital data signal and the output of said oscillator being supplied to said phase comparison circuit respectively at a data input and at a clock signal input thereof and the output of said phase comparison circuit providing an analog output voltage and being connected through said low pass filter to a control circuit of said oscillator, said low pass filter having an output connection, the output of said oscillator providing the bit-rate clock signal generated by the circuit, said circuit further comprising:

a digital frequency comparison circuit (3) comprising means (36) for deriving a delayed clock signal from the clock signal output of said oscillator such that logic level transitions of said delayed clock signal are interleaved in time between logic level transitions of the undelayed clock signal, means for sampling said clock signal and said delayed clock signal at the occurrence of rising and falling flanks of said data signal, a bidirectional counter (39) having a count state output and connected so as to be incremented and decremented by outputs of said sampling means in a manner bringing the count state of said counter into correspondence with a reference value related to the bit frequency of said data signal;

a digital to analog converter (9, 40) having an output and having its digital input connected to the count state output of said counter, and

means (7) for applying the analog output of said digital to analog converter and the output of said low pass filter additively to a control circuit of said oscillator, whereby said output of said D/A converter is not filtered by said low pass filter,

said clock signal output of said oscillator being directly connected to said delayed clock signal deriving means, to said sampling means of said digital frequency comparison circuit and also to said clock signal input of said phase comparison circuit.

4,932,042

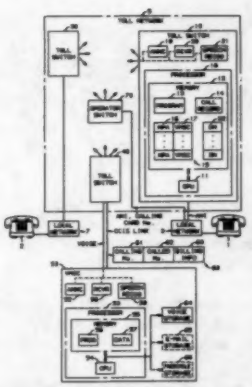
SPONTANEOUS VOICE AND DATA MESSAGING

Elliott Baral, Chicago, Ill.; Percy B. Brown, East Brunswick; Reuben D. Hauptman, Marlboro, both of N.J.; Richard J. Jaeger, Jr., West Chicago, Ill.; Frank C. LaPorta, Millington, N.J.; Pamela J. Lauber, Middletown, N.J.; Richard E. LeCronier, New Monmouth, N.J.; Randall H. Nelson, Ocean, N.J.; Thomas L. Russell, Jr., Colts Neck, N.J., and Wen-Ping Ying, East Brunswick, N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Mar. 3, 1989, Ser. No. 318,292

Int. Cl.[5] **H04M** *3/50, 7/06, 11/00*

U.S. Cl. 379—67 **6 Claims**



1. A telephone switching office comprising:

means for detecting dual tone multifrequency (DTMF) signals; and

processor means, operative under the control of a program stored therein, and responsive to reception of a call comprising an identification of a called station, for controlling the extension of said call to a destination switching office for serving said called station, and for connecting said means for detecting to said call to detect a voice message request signal comprising a DTMF signal, and further responsive to detecting said voice message request signal,

for controlling the extension of said call to and for signaling said identification to a voice message operations center (VMOC) means for recording voice messages.

6. A call processing method for a common carrier network arrangement including message operations center (MOC) means for serving any called stations servable by said network wherein said MOC means comprises a plurality of means for storing different types of messages, comprising:

responsive to reception in a switching office of a spontaneous message service request signal on a call, extending said call from said switching office to said MOC means for storage of a message; and

transmitting to said MOC means the identification of said any called station of said call to identify a station to which said stored message is to be subsequently delivered;

wherein said extending comprises; responsive to reception in a switching office of a spontaneous message request signal on a call, said signal for specifying one of a plurality of requests for different types of messages, extending said call to one of said plurality of means for storing a message of the type requested by said request signal.

4,932,043

APPARATUS FOR CONTROLLING KEY TELEPHONE STATION SET IN KEY TELEPHONE SYSTEM

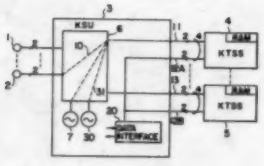
Yasunobu Nakayama, and Yasuji Sato, both of Hachioji, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 23, 1988, Ser. No. 248,151

Claims priority, application Japan, Sep. 24, 1987, 62-239585

Int. Cl.[5] H04M *1/72, 9/02*

U.S. Cl. 379—157 **6 Claims**



1. A key telephone system comprising:

a plurality of key telephone station sets which perform an operation if a discrimination signal is received when key telephone station set information indicating said operation is received;

a plurality of speech lines connected, respectively, to said plurality of key telephone station sets;

a data line connected commonly to all of said key telephone station sets;

a key service unit having means for generating said discrimination signal and selectively applying said discrimination signal to said speech lines, and a data interface connected to said data line, said key service unit sending said discrimination signal from said discrimination signal generating means selectively along one of said speech lines to one of said plurality of key telephone station sets, and said data interface sending said key telephone station set information to said plurality of key telephone station sets along said data line so that only said selected one of said key telephone station sets receives both said discrimination signal and said key telephone station set information.

4,932,044

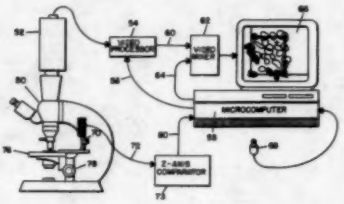
TISSUE ANALYZER

Robert W. Williams, and Pasko Rakic, both of Hamden, Conn., assignors to Yale University, New Haven, Conn.

Filed Nov. 4, 1988, Ser. No. 267,222

Int. Cl.[5] G01N *33/48*; G06M *11/02*; H04N *7/18*

U.S. Cl. 377—10 **7 Claims**



2. The system as recite din claim 1 wherein said compound light microscope is provided with differential interference contrast optics to enhance the particles which are within said focal plane.

4,932,045

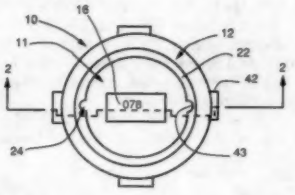
WATERPROOF DIGITAL LAP COUNTER

James A. Kasoff, Baltimore, and William C. Stone, Derwood, both of Md., assignors to Kasoff Enterprises, Inc., Baltimore, Md.

Filed Aug. 2, 1988, Ser. No. 227,134

Int. Cl.[5] G06M *1/02, 1/08*

U.S. Cl. 377—24.2 **16 Claims**



1. A waterproof lap counter comprising:

a waterproof counter case of sufficiently small size to be contained within the palm of a hand of a swimmer or within the underside of a foot of a swimmer, said counter case housing all components necessary to count laps and including

(i) an outer housing having an opening;

(ii) an inner housing slidably and nonrotatably mounted within the opening of said outer housing;

(iii) means for biasing said inner housing outwardly from said outer housing;

(iv) a numeric display;

(v) pressure actuated means for providing an input signal indicative of a lap count including a count switch having a plurality of spaced contacts attached to said inner housing and a contact member attached to said outer housing, said plurality of spaced contacts being spaced apart from said contact member by said biasing means to define an open position of said count switch, said inner housing being operable to move inwardly relative to said outer housing to define a closed position of said count switch in which said spaced contacts abut said contact member to produce said input signal upon abutment of said inner housing against a wall of a swimming

pool during the normal stroke of a swimmer having the waterproof lap counter attached to an extremity;

(vi) means for incrementally counting receiving said input signal and providing an output signal operable to increment said number display; and

(vii) a power source providing power to said numeric display and said incrementally counting means; and

means for attaching said waterproof counter case to an extremity of a swimmer whereby operation of said pressure actuated means automatically increments said numeric display thereby indicating the total number of laps traversed.

4,932,046

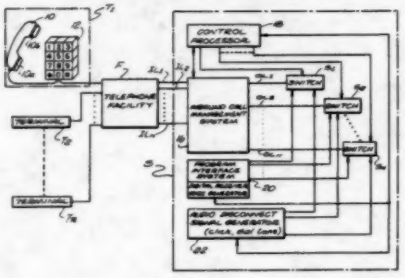
TELEPHONE PROGRAMMING SYSTEM FOR AUTOMATED CALLING

Ronald A. Katz, Los Angeles, Calif., and Dennis L. Ross, Omaha, Nebr., assignors to First Data Resources Inc.

Filed Jul. 28, 1989, Ser. No. 386,076

Int. Cl.[5] H04M *3/14*

U.S. Cl. 379—32 **8 Claims**



1. A telephonic program system to control automated interface intervals with callers at remote terminals through a telephone facility, comprising:

means for receiving telephone calls on lines through said facility for an interface interval;

interface structure for affording an interface interval to callers for a period of time;

a signal generator for providing an audio termination signal to actuate a telephone terminal to produce a disconnect signal sound; and

switch structure controlled to couple received telephone call lines from said means for receiving to said interface structure for said period of time and for subsequently coupling said call lines to said signal generator after said period of time whereby to signal callers to go "on hook".

4,932,047

CONVERSATIONAL VIDEO PHONE

Lawrence D. Emmons; James S. Mackley, both of Grass Valley; David H. Stokes, Nevada City; Rudolph S. Stefenel; William E. Brisko, Jr., both of San Jose, and Michael A. Cooper-Hart, Cupertino, all of Calif., assignors to Luma Telecom, Inc., Santa Clara, Calif.

Continuation-in-part of Ser. No. 795,967, Nov. 7, 1985, Pat. No. 4,715,059. This application Sep. 2, 1987, Ser. No. 92,346

Int. Cl.[5] H04M *11/00*; H04N *7/14*

U.S. Cl. 379—53 **13 Claims**

1. A circuit for coupling a transmitter and receiver to a telephone line coupled to a telephone, comprising:

a first voltage divider in parallel with said telephone consisting of said telephone line and a transmitting transformer;

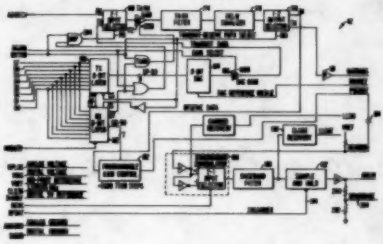
a second voltage divider coupled in parallel with said telephone comprising first and second impedances;

a capacitor;

means for charging said capacitor during usage of said telephone; and

means for switching said capacitor in parallel with said telephone in response to a control signal upon the initiation of a transmission or reception of video data.

7. In a video telephone circuit for coupling to a telephone line having a transmitting line for providing analog data for



transmission and a receiving line for receiving transmissions for demodulation and decoding, the improvement comprising:

a delay equalizer; and

means for coupling said delay equalizer between said transmitting line and said telephone line during a transmission and between said telephone line and said receiving line during a reception of data.

4,932,048

DATA COMMUNICATION APPARATUS WITH VOICE COMMUNICATION CONTROL

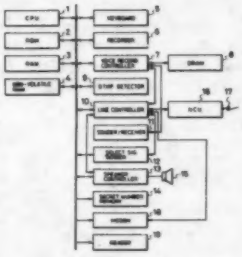
Toshio Kenmochi, and Takaaki Hashimoto, both of Yokohama, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 37,956, Apr. 13, 1987, abandoned. This application Sep. 5, 1989, Ser. No. 403,842

Claims priority, application Japan, Apr. 15, 1986, 61-086269; Oct. 14, 1986, 61-244601

Int. Cl.[5] H04M *1/65, 11/06*

U.S. Cl. 379—67 **6 Claims**



3. A communication apparatus comprising:

data communication means for communicating data;

voice communication means for communicating voice;

speech means for communication speech;

setting means responsive to an incoming call for first setting said apparatus in any one of a manual communication mode in which an operator answers a communication request from a calling station by said speech means, an auto-data communication mode in which said data communication means automatically answers a communication request from a calling station or an auto-voice communication mode in which said voice communication

means automatically answers a communication request from a calling station.

4,932,049

CELLULAR TELEPHONE SYSTEM

William C. Lee, Corona Del Mar, Calif., assignor to PacTel Corporation, San Francisco, Calif.

Filed Feb. 6, 1989, Ser. No. 307,070
Int. Cl.[5] H04B 7/10
U.S. Cl. 379—60 15 Claims

1. In a cellular telephone system wherein a plurality of contiguous cells, each having a different assigned set of transmission frequencies, are arranged with handoff means for maintaining continuous communication with mobile telephones moving from cell to cell, at least one of said cells comprising:

a cell having a plurality of antenna sets, each set being positioned and having transmitting and receiving means directionally configured to limit propagation and reception of signals to substantially within the boundaries of said cell,

control means including means for monitoring the strength of the signal received by each of said antenna sets at each frequency in the assigned set of transmission frequencies for said cell,

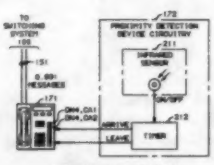
and means for confining transmission, at each frequency in the assigned set of transmission frequencies for said cell, to the antenna set in said cell having the strongest received signal at each such frequency.

4,932,050

PROXIMITY DETECTION FOR TELECOMMUNICATIONS FEATURES

Wayne A. Davidson, Winfield, and Daniel H. Larson, Downers Grove, both of Ill., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jun. 30, 1989, Ser. No. 374,115
Int. Cl.[5] H04M 3/54
U.S. Cl. 379—211 47 Claims



1. A method for use in an arrangement comprising a telephone station set, a telephone switching system, access means interconnecting said station set and said switching system, and proximity detector means associated with said station set, said proximity detector means having a first state corresponding to the presence of a person to answer calls to said station set and having a second state corresponding to the absence of a person to answer calls to said station set, said method comprising

said switching system receiving via said access means information defining the state of said proximity detector means and

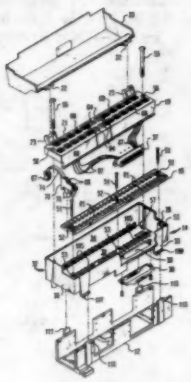
in response to incoming signaling requesting service, said switching system determining the state of said proximity detector means based on said received information.

4,932,051

TELEPHONE NETWORK INTERFACE APPARATUS

Joel Karan, Millburn, and Thomas J. Collins, Wall Township, both of N.J., assignors to Keptel, Inc., Tinton Falls, N.J.

Filed Aug. 7, 1989, Ser. No. 390,539
Int. Cl.[5] H04M 1/00
U.S. Cl. 379—399 7 Claims



1. A telephone network interface apparatus for being mounted to a bracket located at subscriber premises and for terminating and interconnecting a plurality of incoming telephone lines and a plurality of subscriber premises lines and for providing a plurality of demarcation points therebetween, comprising:

a base including a bottom circumscribed by an outwardly extending wall, said bottom divided generally into adjacent first and second lateral portions, and said base provided with first mounting means for mounting said base to said bracket;

a subscriber terminal mounting plate for overlying said first lateral portion and for being fastened to said base, said subscriber terminal mounting plate provided with first mounting means for mounting a plurality of pairs of subscriber terminals thereon;

a plurality of pairs of subscriber terminals for being mounted on said subscriber terminal mounting plate, each pair of subscriber terminals for being interconnected to one of said subscriber premises lines and provided with first electrical conductors one end of which is connected to said pair of subscriber terminals and the distant end of which is provided with a telephone plug;

a telephone jack mounting plate for overlying said second lateral portion of said base and for being fastened to said base, said telephone jack mounting plate provided with second mounting means for mounting a plurality of telephone jacks;

an incoming telephone line connector mounted on said bottom of said base and provided with a plurality of pairs of telephone terminals each for being connected to one of said incoming telephone lines;

a plurality of telephone jacks for being mounted on said telephone jack mounting plate, each jack provided with

second electrical conductors one end of which is connected to the jack and the distant end of which is connected to one of said pairs of telephone terminals;

first fastening means for fastening said subscriber terminal mounting plate to said base and over said first lateral portion and second fastening means for mounting said jack mounting plate to said base and over said second lateral portion;

said telephone plugs for being plugged into said telephone jacks to interconnect said incoming telephone lines and said subscriber premises lines, and said telephone plugs for being unplugged from said telephone jacks to provide demarcation points between said incoming telephone lines and said subscriber premises lines to facilitate determination of whether faults exist on said incoming telephone lines or said subscriber premises lines;

a cover mounted hingedly to said telephone jack mounting plate and for being pivoted closed over said telephone jack mounting plate and said subscriber terminal mounting plate to cover said subscriber terminals and said telephone plugs and jacks and for being pivoted away from said subscriber terminal mounting plate and said telephone jack mounting plate to provide access to said subscriber terminals and said telephone plugs and jacks.

4,932,052

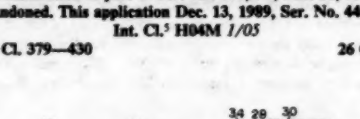
SELF-ADJUSTING HEADSET-HANDSET COMBINATION

Jack Lo, 354 Ardendale Dr., Daly City, Calif. 94014

Continuation-in-part of Ser. No. 371,390, Jun. 26, 1989, abandoned. This application Dec. 13, 1989, Ser. No. 449,400

Int. Cl.[5] H04M *1/05*

U.S. Cl. 379—430 **26 Claims**



26. A combination headset-handset apparatus, comprising:

(A) a housing shaped to fit in the pinna of an ear adjacent the auditory canal, said housing having an inner end which will be positioned adjacent the auditory canal when said housing is positioned in said pinna so that said inner end can supply sound to said auditory canal, said housing having an outer end which extends out of said pinna when said housing is positioned in said pinna,

(B) an extension joined to said housing and extending therefrom in a direction generally perpendicular to the direction between said inner and outer ends of said housing,

(C) clamping means comprising a clamping member which is shaped and attached to said extension such that:

said clamping member can be moved in a linear fashion with respect to said housing from a compacted position relatively close to said housing to an extended position reltively distant from said housing,

when said clamping member is in its compacted position relatively close to said housing, and when said housing is positioned in said pinna, said clamping member will be positioned behind said pinna so that said pinna will be positioned between said clamping member and said housing, and

when said clamping member is in its extended positin relatively distant from said housing and

when said housing is positioned in said pinna, said clamping member will be positioned away from said pinna so that said housing can be withdrawn from said pinna without said clamping member interfering with said pinna, and

when said housing is away from said pinna, said housing can then be moved to said position in said pinna without said clamping member interfering with said pinna, and

(D) a boom connected to said housing, whereby said apparatus may be used as a handset and a headset.

4,932,053

SAFETY DEVICE AGAINST THE UNAUTHORIZED DETECTION OF PROTECTED DATA

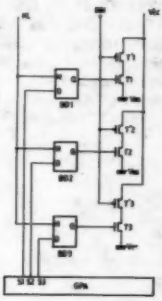
Serge Fruhauf, Peynier, and Laurent Sourgen, Aix en Provence, both of France, assignors to SGS-Thomson Microelectronics, S.A., Gentilly, France

Filed Nov. 3, 1989, Ser. No. 431,534

Claims priority, application France, Nov. 10, 1988, 88 14707

Int. Cl.[5] H04L *9/00*

U.S. Cl. 380—4 **9 Claims**



1. A circuit for the protection of confidential data of a memory in integrated circuit form, said protection circuit comprising, on the same integrated circuit, several simulation cells capable of being controlled individually, these cells having two current consumption states that differ according to the signal that controls them, and a generator of pseudo-random sequences to control these cells, so that each of them is, pseudo-randomly, in one state or in another, thus making it more difficult to determine confidential information by reading the overall current consumption of the integrated circuit.

4,932,054

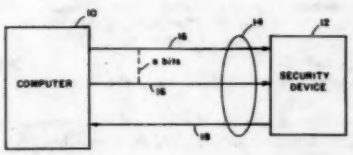
METHOD AND APPARATUS FOR PROTECTING COMPUTER SOFTWARE UTILIZING CODED FILTER NETWORK IN CONJUNCTION WITH AN ACTIVE CODED HARDWARE DEVICE

Wayne W. Chou, 25 Hauley Pl., Ridgefield, Conn. 06877, and Richard E. Erett, 78 White Birch La., Stamford, Conn. 06905

Filed Sep. 16, 1988, Ser. No. 245,714

Int. Cl.[5] G06F *13/14*

U.S. Cl. 380—4 **15 Claims**



1. The method of protecting computer software using a software protection hardware security device plugged into a communications port of a computer which is controlled by the computer software or software within computer control which is desired to be protected comprising the steps of:

applying a plurality of bits containing a disguised predetermined control code thereon to a port of a computer from software which is desired to be protected,

plugging a software protection hardware apparatus into said computer port containing a stored reference code which in at least one form corresponds to said disguised predetermined control code,

comparing said plurality of bits containing said disguised predetermined control code in said software protection hardware with said stored reference code and passing an operational signal when a match occurs,

utilizing said operational signal as an acknowledgement that the disguised predetermined control code is present in said plurality of bits.

4,932,055

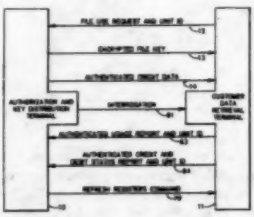
METERING RETRIEVAL OF ENCRYPTED DATA STORED IN CUSTOMER DATA RETRIEVAL TERMINAL

Ron D. Katznelson, San Diego, Calif., assignor to M/A-COM Government Systems, Inc. and Cable/Home Communication Corp., both of San Diego, Calif.

Filed Sep. 10, 1986, Ser. No. 905,775

Int. Cl.[5] H04L 9/00

U.S. Cl. 380—4 **27 Claims**



1. A method of controlling and accounting for retrieval of data from a memory, comprising the steps of

(a) providing a memory containing an encrypted data file from which retrieval must be authorized;

(b) authorizing said retrieval by providing an encryption key for enabling retrieval of said data and a credit signal for use in limiting the amount of data to be retrieved from said file;

(c) limiting the amount of data retrieved from said file in accordance with said credit signal;

(d) recording the amount of data retrieved from said file;

(e) reporting the recorded amount of data retrieved from said file; and

(f) authenticating said report.

4,932,056

METHOD AND APPARATUS FOR USER IDENTIFICATION BASED ON PERMUTED KERNELS

Adi Shamir, Rehovot, Israel, assignor to Yeda Research and Development Company Limited, Rehovot, Israel

Filed Mar. 16, 1989, Ser. No. 324,508

Int. Cl.[5] H04L 9/00

U.S. Cl. 380—23 **26 Claims**

1. A method for identification of a prover to a verifier comprising the steps of:

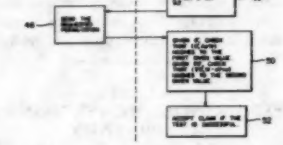
(a) establishing for the prover a secret key consisting of a permutation π over $\{1, 2, \ldots n\}$, and a public key consisting of a number p, a $m \times n$ matrix A, and an n-vector A such that $V_\pi \epsilon K(A)$ modulo p;

(b) sending by the prover to the verifier the cryptographically hashed values of the pairs (σ, AR) and $(\pi\sigma, R_\sigma)$ where R is a random vector and σ is a random permutation, chosen by the prover:

(c) sending by the verifier to the prover a randomly chosen value c in $o \leq c < p$;

(d) determining by the prover and sending to the verifier $W = R_\sigma + cV_{\pi\sigma}$;

(e) revealing by the prover to the verifier either σ or $\pi\sigma$, whichever one is requested by the verifier;



(f) determining by the verifier for the case of σ having been revealed that $(\sigma, A_\sigma W)$ hashes to the value of the cryptographically hashed pair (σ, AR) and for the case of $\pi\sigma$ having been revealed that $(\pi\sigma, W - cV_{\pi\sigma})$ hashes to the value of the cryptographically hashed pair $(\pi\sigma, R_\sigma)$.

4,932,057

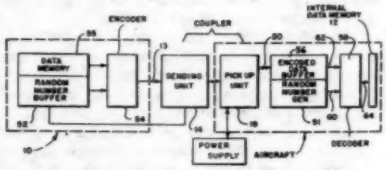
PARALLEL TRANSMISSION TO MASK DATA RADIATION

Melvin Kolbert, Boca Raton, Fla., assignor to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Oct. 17, 1988, Ser. No. 258,964

Int. Cl.[5] H04K 1/10

U.S. Cl. 380—33 **4 Claims**



1. A method for securing aircraft data distribution from electromagnetic radiation detection, the method comprising the steps:

coupling data from a data source outside the aircraft to a central non-volatile memory for storage of data subsets;

loading a plurality of remote local memories from the central memory in parallel with corresponding data subsets, whereby any electromagnetic radiation from data loading results in a scrambled superimposed radiation signal from all the subsets from which the individual data subsets cannot be detected; and

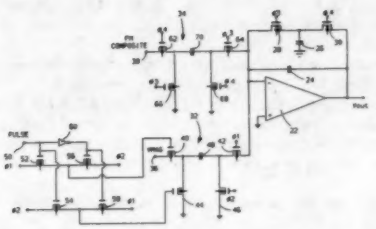
individually parallel loading the data subsets from the local memories to corresponding utilization devices.

4,932,058

PILOT CANCELLATION CIRCUIT

Jeffrey J. Marrah; Gregory J. Manlove, both of Kokomo, and Richard A. Kennedy, Russiaville, all of Ind., assignors to Delco Electronics Corporation, Kokomo, Ind.

Filed Aug. 14, 1989, Ser. No. 393,497
Int. Cl.[5] H04H 5/00
U.S. Cl. 381—13 3 Claims



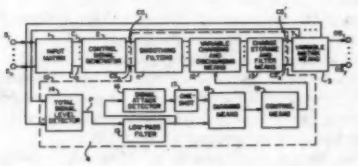
1. A pilot cancellation circuit comprising a first input adapted to receive an FM composite signal containing a pilot component, a second input adapted to receive a DC voltage proportional to said pilot component, a summing junction, a first switched capacitor network connected between said first input and said summing junction, a second switched capacitor network connected between said second input and said summing junction, amplifier means having a first input terminal connected with said summing junction, a second input terminal connected to a voltage reference, and an output, clock means applying a pair of non-overlapping clock signals to said first network to sample said composite signal at a predetermined sample rate at a multiple of the frequency of said pilot signal, said clock means applying a second pair of non-overlapping clock signals to said second network, said second pair of clock signals substantially lacking any third harmonic component of said pilot signal, whereby the output of said operational amplifier means is an FM composite with the pilot signal substantially eliminated.

4,932,059

VARIABLE MATRIX DECODER FOR PERIPHONIC REPRODUCTION OF SOUND

James W. Fosgate, Heber, Utah, assignor to Fosgate Inc., Heber City, Utah

Filed Jan. 11, 1988, Ser. No. 142,140
Int. Cl.[5] H04S 3/00
U.S. Cl. 381—22 9 Claims



1. In a variable matrix decoding apparatus intended for the periphonic reproduction of sounds using encoded input signals representing said sounds, a method of controlling both attack and decay time constants of said encoded input signals in order to reduce intermodulation effects to a level that is inaudible, comprising the steps of

determining the onset of attacks of sounds at high input signal levels and rapidly increasing the rate, and therefore shorten the attack and decay time constants, with which the decoding apparatus responds to said signals for a predetermined short period, thereby minimizing the audibility of intermodulation distortionn, and

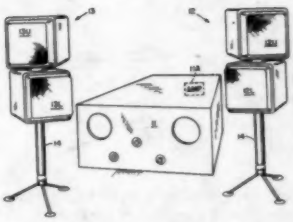
at lower overall input signal levels following each attack, reducing the rate, and therefore increasing the decay time constants, with which the decoder responds to said sounds, thereby reducing the possibility of producing imperfections in the periphonic reproduction of sound following attacks.

4,932,060

STEREO ELECTROACOUSTICAL TRANSDUCING

William P. Schreiber, Ashland, Mass., assignor to Bose Corporation, Framingham, Mass.

Filed Mar. 25, 1987, Ser. No. 29,991
Int. Cl.[5] H04R 5/02
U.S. Cl. 381—24 28 Claims



1. Stereo electroacoustical transducing apparatus comprising,

dual-channel woofer means mounted on a baffle inside a dual-channel woofer enclosure divided into first and second subchambers by said baffle and having port means for radiating bass acoustical energy for receiving left and right input audio electrical signals at first and second inputs, summing bass spectral components of said left and right input audio electrical signals to provide a summed bass acoustical signal for radiation by said port means and providing left and right output electrical signals,

said dual-channel woofer means and said dual-channel woofer enclosure being characterized by an acoustic response that falls off sharply above a predetermined upper cutoff frequency in the lower range of audio frequencies for radiating in phase spectral components or said left and right input signals by said port means below said predetermined upper cutoff frequency,

left and right satellite radiating means for radiating sound signals representative of said left and right output signals respectively,

and means for coupling said left and right output electrical signals to said left and right satellite means respectively.

wherein said woofer means comprises a plurality of ports as the sole acoustic output means.

4,932,061

MULTI-PULSE EXCITATION LINEAR-PREDICTIVE SPEECH CODER

Peter Kroon, Murray Hill, N.J.; Edmond F. A. Deprettere, The Hague, and Robert J. Sluyter, Eindhoven, both of Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 20, 1986, Ser. No. 841,906
Claims priority, application Netherlands, Mar. 22, 1985, 8500843
Int. Cl.[5] G10L 3/02, 7/02, 9/18
U.S. Cl. 381—30 7 Claims

1. A multi-pulse excitation linear-predictive coder for processing digital speech signals partitioned into segments, comprising:

a linear prediction analyzer responsive to the speech signal

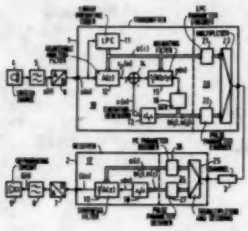
of each segment for generating prediction parameters characterizing the short-time spectrum of the speech signal,

an excitation generator for generating a multi-pulse excitation signal partitioned into intervals, each excitation interval containing a sequence of at least one and at most a predetermined number of pulses,

means for forming an error signal representative of the difference between the speech signal and a synthetic speech signal constructed on the basis of the multi-pulse excitation signal and the prediction parameters,

means for perceptually weighting the error signal,

means responsive to the weighted error signal for generating in each excitation interval pulse parameters controlling



the excitation generator to minimize, in a time interval at least equal to the excitation interval, a predetermined function of the weighted error signal

wherein

the excitation generator is arranged for generating an excitation signal which in each excitation interval has a pulse pattern having a spacing which defines a one-dimensional grid of a predetermined number of equidistant pulses, and

means for controlling the excitation generator to generate pulse parameters characterizing the position of the grid relative to the beginning of the excitation intervals and characterizing variable amplitudes of the pulses of the pulse pattern.

4,932,062

METHOD AND APPARATUS FOR FREQUENCY ANALYSIS OF TELEPHONE SIGNALS

Chris A. Hamilton, Montclair, N.J., assignor to Dialogic Corporation

Filed May 15, 1989, Ser. No. 351,393
Int. Cl.[5] G10L 5/00
U.S. Cl. 381—43 **20 Claims**

1. A method for identifying an analog or digital signal on a telecommunications line which was produced by a predetermined human voice response, which method comprises the steps of:

(a) storing $C_k(x_k,n)$ and $S_k(x_k,n)$ where:

$$C_k(x_k,n)=x_k{*}\cos(2\pi kn/N) \text{ and } S_k(x_k,n)=x_k{*}\sin(2\pi kn/N)$$

for: $k=0,\ldots,(N-1)$; $n=0,\ldots,(N-1)$; and x_k ranging over all the values of a set of M predetermined digital levels into which the amplitude of the signal is mapped, if the signal is a digital signal, or into which samples of the amplitude of the signal is mapped, if the signal is an analog signal

where: N is a predetermined number of values of the signal, if the signal is a digital signal, or N is the predetermined number of samples of the signal, if the signal is an analog signal, which values or samples are used in determining at least a portion of the frequency spectrum; and n is an index of frequency bins of the frequency spectrum;

(b) determining the sound level of the signal and, when the sound level of the signal exceeds a first predetermined sound level, setting a timer and a frame counter;

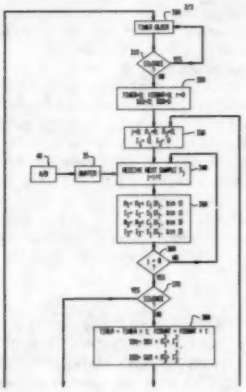
(c) obtaining a digital value from the signal, the digital value comprising an amplitude value of the signal if the signal is a digital signal and the digital value comprising a sample of the amplitude of the signal if the signal is an analog signal;

(d) matching the digital value with one of the predetermined set of M predetermined digital levels into which the signal is mapped to provide a value x_j;

(e) retrieving $C_j(x_j,f)$ and $S_j(x_j,f)$ from storage for each of predetermined frequency bins f for the value x_j;

(f) accumulating the sum of $C_j(x_j,f)$ and $S_j(x_j,f)$ for N digital values x_j by repeating steps (c) through step (f) a sufficient number of times, to provide the real and imaginary part of the content for each of the predetermined frequency bins f;

(g) determining the sound level of the signal and, when the



sound level of the signal falls below a second predetermined sound level, proceeding to step (i), otherwise proceeding to step (h);

(h) determining a measure of energy for each of the predetermined frequency bins f from the real and imaginary part of the content thereof, incrementing the frame counter and the timer and, if the frame counter is less than a predetermined frame count, proceeding to step (c), otherwise, storing the measure of energy in the predetermined frequency bins f for predetermined frames, resetting the frame counter and proceeding to step (c);

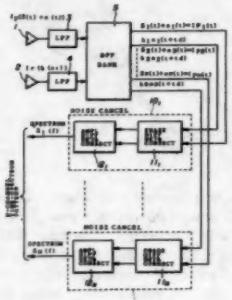
(i) determining if the timer is outside of a predetermined time range and, if so, transmitting a message that the signal corresponds to an unrecognized response;

(j) comparing variations of functions of the measure of energy for the predetermined frequency bins f in predetermined frames with predetermined variations of the measure of energy for the predetermined frequency bins f for the predetermined human voice response and, if they compare within predetermined limits, transmitting a message that the predetermined human voice response has been detected.

4,932,063
NOISE SUPPRESSION APPARATUS

Shogo Nakamura, Matsudo, Japan, assignor to Ricoh Company, Ltd., Japan

Filed Oct. 31, 1988, Ser. No. 265,407
Claims priority, application Japan, Nov. 1, 1987, 62-276418
Int. Cl.[5] H04B *15/00*
U.S. Cl. 389—94 12 Claims



1. An apparatus for noise suppression of a voice that includes audio and noise, said apparatus comprising:

main input means for primarily picking up the voice and for outputting an input signal including an audio signal and a first noise component, said first noise component being generated from the noise in the voice;

reference input means for picking up a second noise component generated from the noise in the voice;

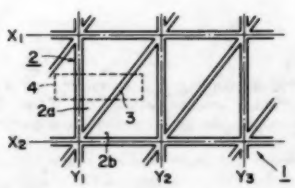
filter bank means for band-dividing the input signal from said main input means and the second noise component from said reference input means to output a plurality of divided band components; and

noise cancelling means for obtaining a phase difference between the input signal and the second noise component with respect to each of the divided band components output from said filter bank means so as to correct the input signal based on the phase difference and for cancelling the first noise component in said input signal.

4,932,064
SEMICONDUCTOR DEVICE

Takeshi Kasahara, Tsurugashima, Japan, assignor to Toko Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 15, 1987, Ser. No. 108,625
Claims priority, application Japan, Oct. 21, 1986, 61-250429
Int. Cl.[5] G06K *9/00*
U.S. Cl. 382—8 3 Claims



1. A semiconductor device comprising:

a wafer having a plurality of chips, scribe lines and element-separating streets therein and forming a pattern on said wafer;

at least one of said chips having at least two elements of approximately the same area formed therein;

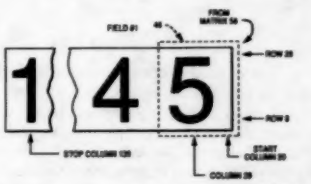
said at least two elements being arranged on said at least one chip with a separating street between them, said separating street being used for separating said elements and having at least a portion thereof inclined at an angle with respect to scribe lines along which said semiconductor device is to be cut; and

said wafer pattern being recognizable by pattern recognition equipment.

4,932,065
UNIVERSAL CHARACTER SEGMENTATION SCHEME FOR MULTIFONT OCR IMAGES

Oleg Feldgajer, Waterloo, Canada, assignor to NCR Corporation, Dayton, Ohio

Filed Nov. 16, 1988, Ser. No. 271,982
Int. Cl.[5] G06K *9/34*
U.S. Cl. 382—9 13 Claims



1. In a processing system which presents a matrix of image data, with the matrix comprising rows and columns of binary pixels associated with a document having at least one field of characters thereon, a method of finding the binary pixels associated with a character included in said field comprising the steps:

(a) selecting an examining window whose size covers a predetermined number of rows and columns of the pixels associated with a character in the image data;

(b) calculating a probability density function, hereinafter referred to as PDF, for each pixel within the examining window for each character in a set of characters to be segmented to generate a composite PDF for each pixel within the examining window;

(c) positioning the examining window over a portion of said field;

(d) obtaining a total value for the examining window by using each binary one pixel in the examining window and its associated composite PDF;

(e) moving said examining window relative to said field and repeating step (d) so as to obtain a peak or maximum total value for the examining window;

(f) using the maximum total value obtained from step (e) as an indication that the examining window contains image data associated with a character in the set of characters; and

(g) repeating steps (c) through (e) for the remainder of the image data associated with said field.

4,932,066

INFORMATION SIGNAL TRANSMISSION SYSTEM

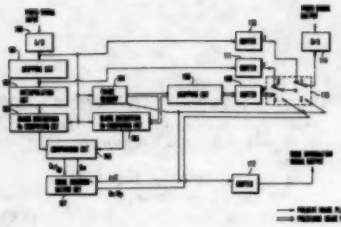
Tadayoshi Nakayama, Yokohama; Chikara Sato; Kenichi Nagasawa, both of Kawasaki; Tomohiko Sasatani, Yokohama; Katsuji Yoshimura, Kawasaki; Koji Takahashi, Yokohama, and Susumu Kozuki, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 918,527, Oct. 14, 1986, abandoned. This application Nov. 23, 1988, Ser. No. 277,421

Claims priority, application Japan, Oct. 15, 1985, 60-230510; Oct. 24, 1985, 60-238501; Oct. 24, 1985, 60-238503; Oct. 28, 1985, 60-240762; Nov. 22, 1985, 60-263080

Int. Cl.[5] G06K *9/00*

U.S. Cl. 382—56 7 Claims



1. A system for transmitting an image information signal consisting of information signals corresponding to picture elements, whereby each of continuous pictures consists of a certain predetermined number of picture elements, comprising:

(A) picture element data forming means for forming a plurality of kinds of picture element data to be transmitted, said picture element data forming means being arranged to receive said image information signals for every one of picture planes and to form said plurality of kinds of picture element data, from the received image information signals for one picture plane on the basis of a plurality of kinds of transmitted picture element forming modes which involve picture element data to be transmitted which are different from each other in number contained in a unit picture element block consisting of a predetermined number of picture elements;

(B) selecting means for selecting a kind of transmission mode, said selecting means being arranged to divide the received image information signals for one picture plane into said unit picture element blocks and to select either one of the plurality kinds of transmitted picture element forming modes and a non-transmission mode in which no information signal of the picture element in the unit picture element block for the picture plane is transmitted, depending upon a correlation of the respective ones of the divided unit picture element blocks; and

(C) transmitted signal forming means for forming the signal to be transmitted, said transmitted signal forming means being arranged to select any one of the transmitted picture element data out of the plurality kinds of picture element data formed by said transmitted picture element data forming means, on the basis of the kind of transmission mode selected by said transmitted picture element mode selecting means for every ones of the unit blocks of the received image information signals for one picture plane.

4,932,067

LINEAR MOTION BEARING

Andrew L. Pester, Huntington; Peter R. Mugglestone, Northport, and Robert C. Magee, Manhasset, all of N.Y., assignors to Thomson Industries, Inc., Port Washington, N.Y.

Filed May 30, 1989, Ser. No. 358,560

Int. Cl.[5] F16C *29/06*

U.S. Cl. 384—45 10 Claims

1. A linear motion bearing comprising: a rail; a bearing carriage movable along said rail; a plurality of recirculating rolling element tracks formed in said carriage for conducting a plurality of rolling elements between a load bearing track and a return track, said rolling elements supporting said carriage on said rail when in said load bearing track; a plurality of integral retainer and inner guides structure substantially supported by said bearing carriage; and a plurality of end caps including turnaround tracks connecting said load bearing tracks and said return tracks, said end caps receiving the integral inner guides of the retainer and inner guides structure.

4,932,068

METHOD OF RECORDING A PLURALITY OF IMAGES IN SUPERPOSITION ON A RECORDING MEDIUM

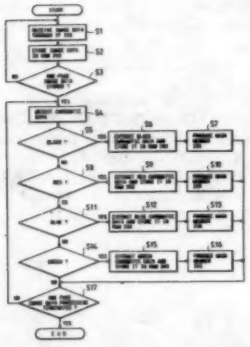
Takakuni Sonoda, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Japan

Filed Feb. 8, 1989, Ser. No. 307,779

Claims priority, application Japan, Feb. 9, 1988, 63-28152

Int. Cl.[5] G03B *27/30*

U.S. Cl. 355—77 8 Claims



1. A method of recording a predetermined number of images on a first recording medium with the use of two sheets of a second recording medium, said method comprising the steps of:

discriminating said predetermined number of images between a first group containing a first number of images and a second group containing a second number of images;

sequentially forming a latent image of each of said first number of images in superposition on one of said two second recording mediums;

sequentially forming a latent image of each of said second number of images in superposition on the other of said two second recording mediums; and

sequentially developing said latent images of each of said two second recording mediums and providing visible images in superposition on said first recording medium.

4,932,069

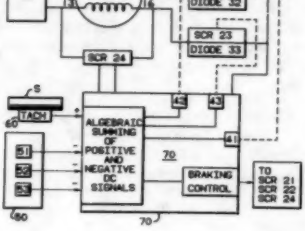
ELEVATOR MOTOR CONTROL

George A. Ralph, 1140 Detwiler Dr., and Charles R. Holtzinger, 417 N. George St., both of York, Pa. 17404

Filed Aug. 2, 1989, Ser. No. 388,409

Int. Cl.[5] H02P *5/40*

U.S. Cl. 318—809 **7 Claims**



1. A control system for a three phase induction motor wherein said motor has a first control terminal (**11**), a second control terminal (**12**) and a third control terminal (**13**),

wherein said motor has a first neutral lead (**14**), a second neutral lead (**15**) and a third neutral lead (**16**),

wherein said first neutral lead (**14**) has a first SCR (**21**) connected thereto and wherein said first SCR (**21**) is wired to a first trigger (**41**) on a control means (**70**),

wherein said second neutral lead (**15**) has a second SCR (**22**) connected thereto and wherein said second SCR (**22**) is wired to a second trigger (**42**) on said control means (**70**),

wherein said third neutral lead (**16**) has a third SCR (**23**) connected thereto and wherein said third SCR (**23**) is wired to a third trigger (**43**) on said control means (**70**),

wherein said control system includes a first means (**50**) for generating a negative DC signal representative of speed selected (**51, 52, 53**) and for supplying said negative DC signal to a summing portion of said control means (**70**),

wherein said control system includes a second means (**60**) for generating a positive DC signal representative of motor speed and for supplying said positive DC signal to a summing portion of said control means (**70**),

means (**41, 42, 43**) wherein said summed signals are transmitted to said SCR's wherein their impedance is lowered and the current of the motor is increased or wherein their impedance is raised and the current of the motor is decreased.

4,932,070

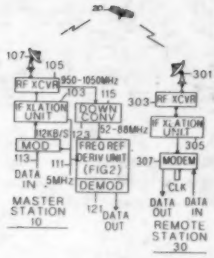
MECHANISM FOR DERIVING ACCURATE FREQUENCY REFERENCE FOR SATELLITE COMMUNICATIONS BURST DEMODULATOR

George W. Waters, Indialantic; Charles R. Burr, Palm Bay, and Charles W. Richards, IV, Melbourne Beach, all of Fla., assignors to Scientific Atlanta, Atlanta, Ga.

Filed Aug. 22, 1988, Ser. No. 234,937

Int. Cl.[5] H04B *1/60*; H04J *3/06*

U.S. Cl. 455—10 **23 Claims**



1. For use with a communication system having a first station and a second station remote with respect to said first station, said first and second stations communicating with one another over a communication link that subjects the carrier frequencies of signals transmitted thereover to an offset of their respective frequencies, said first station modulating information signals for delivery to said second station onto a first carrier frequency that is transmitted by said first station over said link on a continuous basis, said second station modulating information signals for delivery to said first station onto a second carrier frequency that is transmitted over said link on a burst mode basis, a method of enabling information signals, modulated onto said second carrier frequency which is transmitted on a burst mode basis from said second station over said link to said first station and thereby subjected to said frequency offset, to be recovered at said first station comprising the steps of:

at said second station,

(a) generating said second carrier frequency in accordance with a reference signal derivable from said first carrier frequency received thereby; and

at said first station,

(b) receiving each of said first and second carrier frequencies that have been transmitted over said communication link; and

(c) deriving, from said first and second carrier frequencies, a filtered burst demodulation reference frequency for demodulating information signals that have been modulated onto said second, burst mode carrier frequency by said second station.

4,932,071

AIRCRAFT VOICE COMMUNICATION ANTI-BLOCKING DEVICE

Alfred Arndt, 23 Sunday Dr., and John G. Rutty, 60 Maple Grove Rd., both of Hanover, Pa. 17331

Filed Mar. 16, 1988, Ser. No. 168,955

Int. Cl.[5] H04B *1/44*

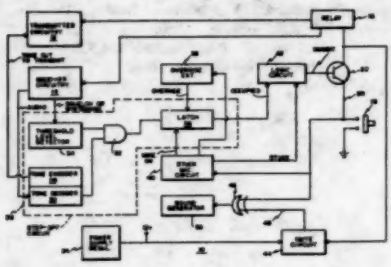
U.S. Cl. 455—58 **20 Claims**

9. A device for preventing radio transmission on an occupied channel and having:

a step-off circuit for detecting received transmission on a radio channel, said step-off circuit having a tone decoder for detecting the presence of a tone in the received transmission, the tone being sub-audible, said step-off circuit

generating an occupied signal depending upon detection of the tone; and

an anti-blocking switch for insertion in series with a push-to-



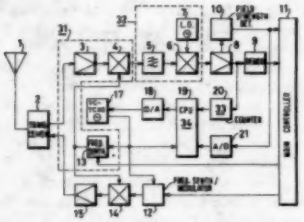
talk switch in a push-to-talk line of a transceiver, said anti-blocking switch being a controlled switch and having a control terminal and opening when said occupied signal is present such that outgoing transmission is inhibited.

4,932,072

MOBILE STATION EQUIPMENT FOR A MOBILE RADIO TELEPHONE SYSTEM

Yoshio Toko, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed May 20, 1988, Ser. No. 196,259
Claims priority, application Japan, May 22, 1987, 62-125283
Int. Cl.[5] H04B 11/16, 1/26
U.S. Cl. 455—76 10 Claims



1. A mobile station equipment for a mobile radio telephone system comprising:

first frequency converting means, which includes a first local oscillator and a first mixer, for converting a radio frequency (RF) reception signal into a first intermediate frequency (IF) signal based on the output of said first local oscillator;

second frequency converting means, which includes a second local oscillator and a second mixer, for converting the first IF signal from said first frequency converting means into a second IF signal based on the output of said second local oscillator;

a voltage-controlled, temperature-compensated crystal oscillator for providing a reference frequency to at least said first local oscillator;

counting means for counting the second IF signal;

means for providing a reference value; and

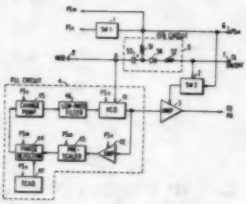
computational control means which evaluates the difference of a count value of said counting means from said reference value, and provides a control signal for controlling said voltage-controlled crystal oscillator based on the evaluated difference, to said voltage-controlled crystal oscillator.

4,932,073

TRANSMITTER HAVING PLL CIRCUIT

Hideki Ueda, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Jan. 19, 1989, Ser. No. 298,728
Claims priority, application Japan, Jan. 19, 1988, 63-7452
Int. Cl.[5] H04B 1/04; H01Q 11/12
U.S. Cl. 455—113 13 Claims



1. A transmitter comprising:

phase-locked loop (PLL) circuit means for producing an oscillation signal, the frequency of said oscillation signal varying with a control signal;

amplifier means connected to the output of said PLL circuit means for amplifying said output;

switch means for turning on and off said amplifier means; and

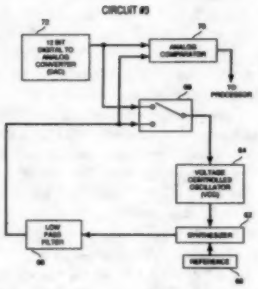
frequency fluctuation depressing means connected to said PLL circuit means and said switch means for depressing frequency fluctuation in the output of said PLL circuit means by changing the voltage of said control signal at a time when said amplifier means is turned on.

4,932,074

RAPID SCANNING RADIO WITH MULTI-MODE LOCAL OSCILLATOR CONTROL

Ben F. McCormick, II, Noblesville, Ind., assignor to Uniden America Corporation, Ft. Worth, Tex.

Filed Apr. 1, 1988, Ser. No. 176,628
Int. Cl.[5] H04B 1/16
U.S. Cl. 455—167 1 Claim



1. A rapid scanning radio circuit with multi-mode local oscillator control, comprising:

an electrically variable local oscillator having a frequency control input; a reference oscillator;

synthesizer means for comparing an output signal from said local oscillator with an output signal from said reference oscillator, said synthesizer means including a frequency code input;

filter means for filtering an output signal from said synthesizer means;

a DAC;

switch means for coupling said local oscillator frequency control input to said filter means in a closed-loop mode and to said DAC in an open-loop mode;

first scan means operative during said closed-loop mode for sequentially supplying a plurality of frequency codes to said frequency code input of said synthesizer means, said scan means supplying each frequency code for a sufficient duration for the signal on said oscillator frequency control input to reach a steady state;

processor means operative during said closed-loop mode for determining a DAC input value which corresponds to the steady-state level of the signal on said oscillator frequency control input; and

second scan means operative during said open-loop mode for sequentially loading said DAC with said DAC input values identified by said processor means.

4,932,075

HIGH SPEED WIDE RANGE VARIABLE RATE POWER DETECTOR

Peter Dimitrijevic, Redondo Beach; Mark Skidmore, Long Beach, and Theodore S. Fishkin, Lawndale, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Jul. 3, 1986, Ser. No. 881,985

Int. Cl.[5] H04B 17/00

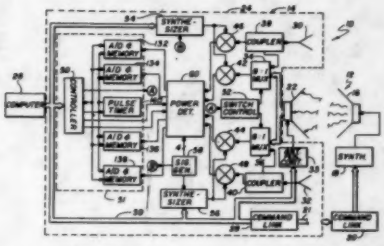
U.S. Cl. 455—226 **2 Claims**

1. A high speed wide range variable rate power detector for providing an output signal proportional to the power associated with an input signal comprising:

first means for down converting the input signal to an intermediate frequency signal;

second means for converting the intermediate frequency signal to a DC signal, said second means including:

an integrator connected to said first means with a feedback capacitor and



a linear detector including means for summing the log of the absolute value of the intermediate frequency signal with the log of a signal fed back from the output of said integrator;

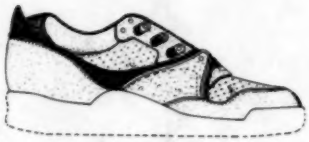
third means for varying the rate of conversion of said intermediate frequency signals to DC signals; and

fourth means for providing said output signal as a function of the logarithm of said DC signal.

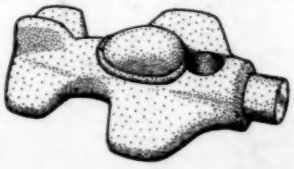
DESIGNS

JUNE 5, 1990

308,280
SHOE UPPER
Lawrence Selbiger, Portland, Oreg., assignor to Avia Group International, Inc., Portland, Oreg.
Filed Jun. 22, 1989, Ser. No. 370,297
Term of patent 14 years
U.S. Cl. D2—314



308,281
AIRPLANE-SHAPED SHOELACE OR DRAWSTRING FASTENER
Mark W. Bergman, Minnetonka, and Daniel L. Harris, Minneapolis, both of Minn., assignors to Harber, Inc., Eden Prairie, Minn.
Filed Jun. 28, 1988, Ser. No. 212,725
Term of patent 14 years
U.S. Cl. D2—316

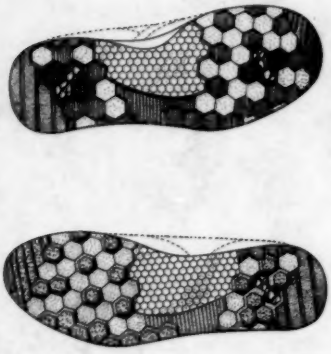


308,282
CIRCULAR SHOELACE OR DRAWSTRING FASTENER
Mark W. Bergman, Minnetonka, and Daniel L. Harris, Minneapolis, both of Minn., assignors to Harber Inc., Eden Prairie, Minn.
Filed Jun. 28, 1988, Ser. No. 212,732
Term of patent 14 years
U.S. Cl. D2—316

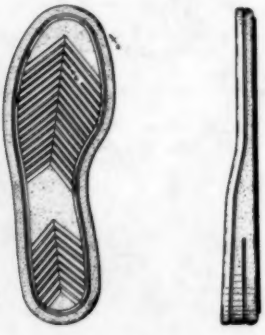
308,283
BEAR-SHAPED SHOELACE OR DRAWSTRING FASTENER
Mark W. Bergman, Minnetonka, and Daniel L. Harris, Minneapolis, both of Minn., assignors to Harber Inc., Eden Prairie, Minn.
Filed Jun. 28, 1988, Ser. No. 212,740
Term of patent 14 years
U.S. Cl. D2—316

308,284
HEART-SHAPED SHOELACE OR DRAWSTRING FASTENER
Mark W. Bergman, Minnetonka, and Daniel L. Harris, Minneapolis, both of Minn., assignors to Harber, Inc., Eden Prairie, Minn.
Filed Jun. 28, 1988, Ser. No. 212,734
Term of patent 14 years
U.S. Cl. D2—316

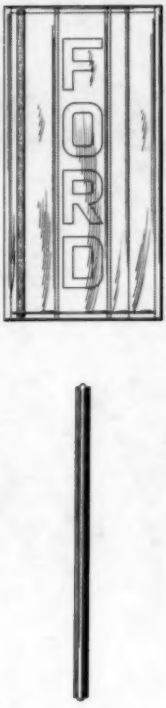
308,285
SHOE SOLE
Ralph Serna, Hingham, Mass., assignor to Reebok International Ltd., Stoughton, Mass.
Filed Jun. 26, 1989, Ser. No. 371,026
Term of patent 14 years
U.S. Cl. D2—320



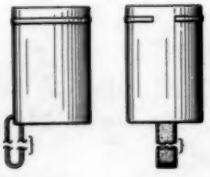
308,286
FOOTWEAR UNIT SOLE
Arnold S. Austin, East Brookfield, Mass., assignor to Qualsaug Corporation, North Brookfield, Mass.
Filed Mar. 16, 1988, Ser. No. 168,755
Term of patent 14 years
U.S. Cl. D2—320



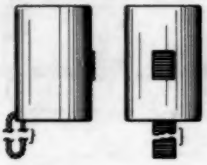
308,287
SEAT BELT PAD
Darlene M. Miller, and John A. Miller, both of 2017 Valencia Cir., Kissimmee, Fla. 32741
Filed May 18, 1988, Ser. No. 195,543
Term of patent 14 years
U.S. Cl. D2—639



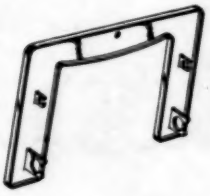
308,288
UMBRELLA HANDLE
Ann S. Cain, Cincinnati, Ohio, assignor to 'totes', incorporated, Loveland, Ohio
Filed Dec. 6, 1988, Ser. No. 280,733
Term of patent 14 years
U.S. Cl. D3—12



308,289
UMBRELLA HANDLE
Ann S. Cain, Cincinnati, Ohio, assignor to 'totes', incorporated, Loveland, Ohio
Filed Dec. 6, 1988, Ser. No. 280,735
Term of patent 14 years
U.S. Cl. D3—12



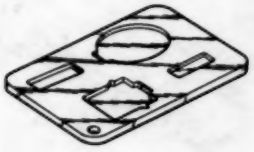
308,290
FISHING ROD CARRIER
Thomas W. Mulvaney, Kansas City, Mo., assignor to Spectrum Innovations, Inc., Kansas City, Mo.
Filed Jan. 28, 1987, Ser. No. 7,818
Term of patent 14 years
U.S. Cl. D3—38



308,291
SECURITY WALLET
William T. O'Neal, 10449 Yorkford Dr., Dallas, Tex. 75238
Filed Dec. 10, 1986, Ser. No. 940,073
Term of patent 14 years
U.S. Cl. D3—56

308,292
KEY HOLDER
Chi L. Lai, 4J Man Wo Garden Mansion, 38 Yuet Wah Street, Kwun Tong, Kowloon, Hong Kong
Filed Jan. 14, 1988, Ser. No. 144,027
Claims priority, application United Kingdom, Sep. 14, 1987, 1044836
Term of patent 14 years
U.S. Cl. D3—61

308,293
KEY HOLDER
Chester M. Marlin, 36530 Jefferson, No. 91, Mount Clemens, Mich. 48045
Filed Mar. 25, 1988, Ser. No. 172,854
Term of patent 14 years
U.S. Cl. D3—61

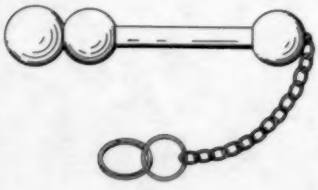


308,294
KEY CHAIN
Wayne Krassner, 340 E. 83rd St., Apt. 3B, New York, N.Y.
Filed Feb. 29, 1988, Ser. No. 162,358
Term of patent 14 years
U.S. Cl. D3—61

308,295
SEPARABLE KEY RING
Steven D. Sherlin, 18550 Hatteras #119, Tarzana, Calif. 91356
Filed Mar. 21, 1988, Ser. No. 171,308
Term of patent 14 years
U.S. Cl. D3—61

308,296
KEY RING
Chia-Mo Chen, 12F-1, No. 105, Hang Chow South Rd., Sec. 2, Taipei, Taiwan
Filed Sep. 12, 1988, Ser. No. 243,008
Term of patent 14 years
U.S. Cl. D3—62

308,297
COMBINED KEY HOLDER AND SELF DEFENSE WEAPON
Frank J. Romano, 210 E. Timberlane, Absecon, N.J. 08201
Filed Jul. 21, 1986, Ser. No. 887,449
Term of patent 14 years
U.S. Cl. D3—62



308,298
LUGGAGE CASE
William L. King, Denver, and Roger D. Winter, Lakewood, both of Colo., assignors to Samsonite Corporation, Denver, Colo.
Filed Feb. 11, 1986, Ser. No. 827,645
Term of patent 14 years
U.S. Cl. D3—76

308,299
HANGER COVER
Verena H. Houghtaling, 1148 Skeet Club Rd., High Point, N.C.
Filed Nov. 9, 1987, Ser. No. 118,358
Term of patent 14 years
U.S. Cl. D6—328

308,300
CHAIR
Andras Dozsa-Farkas, München, Fed. Rep. of Germany, assignor to Giroflex Entwicklungs AG, Koblenz, Switzerland
Filed Mar. 16, 1987, Ser. No. 26,135
Claims priority, application Switzerland, Dec. 30, 1986, DM/008001
Term of patent 14 years
U.S. Cl. D6—372

308,301
CHAIR
Andras Dozsa-Farkas, München, Fed. Rep. of Germany, assignor to Giroflex Entwicklungs AG, Koblenz, Switzerland
Filed Mar. 16, 1987, Ser. No. 26,131
Claims priority, application Switzerland, Dec. 30, 1986, DM/008 001
Term of patent 14 years
U.S. Cl. D6—372

308,302
CHAIR
Andras Dozsa-Farkas, Munich, Fed. Rep. of Germany, assignor to Giroflex Entwicklungs AG, Koblenz, Switzerland
Filed Mar. 16, 1987, Ser. No. 26,132
Claims priority, application Switzerland, Dec. 30, 1986, DM/008 001
Term of patent 14 years
U.S. Cl. D6—379

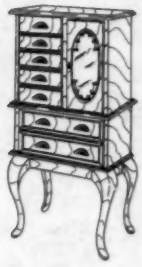
308,303
CHAIR
Andras Dozsa-Farkas, München, Fed. Rep. of Germany, assignor to Giroflex Entwicklungs AG, Koblenz, Switzerland
Filed Mar. 16, 1987, Ser. No. 26,163
Claims priority, application Switzerland, Dec. 30, 1986, DM/008 001
Term of patent 14 years
U.S. Cl. D6—379

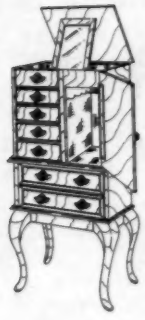
308,304
CHAIR
Andras Dozsa-Farkas, München, Fed. Rep. of Germany, assignor to Giroflex Entwicklungs AG, Koblenz, Switzerland
Filed Mar. 16, 1987, Ser. No. 26,138
Claims priority, application Sweden, Dec. 30, 1986, DM/008001
Term of patent 14 years
U.S. Cl. D6—372

308,305
CHAIR
Warren H. Snodgrass, 223 Woodland Rd., Kentfield, Calif. 94904
Filed Jul. 20, 1987, Ser. No. 75,309
Term of patent 14 years
U.S. Cl. D6—379

308,306
CHAIR
Andras Dorza-Farkas, München, Fed. Rep. of Germany, assignor to Giroflex Entwicklungs AG, Koblenz, Switzerland
Filed Mar. 16, 1987, Ser. No. 26,136
Term of patent 14 years
U.S. Cl. D6—379

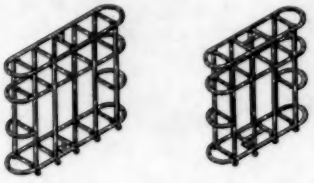
308,307
ARMOIRE
H. Thomas Keller, High Point, N.C., assignor to Rosalco, Inc., Louisville, Ky.
Filed Jun. 12, 1989, Ser. No. 365,034
Term of patent 14 years
U.S. Cl. D6—439





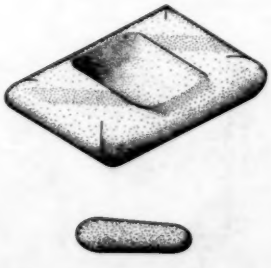
308,308
VANITY TABLE
H. Thomas Keller, High Point, N.C., assignor to Rosalco, Inc., Louisville, Ky.
Filed Aug. 1, 1989, Ser. No. 388,624
Term of patent 14 years
U.S. Cl. D6—444

308,309
DISPLAY STAND
Robert P. Gersin; Ingrid G. Caruso, and Samuel Blay, all of New York, N.Y., assignors to Robert P. Gersin Associates, Inc., New York, N.Y.
Filed Jun. 25, 1987, Ser. No. 66,846
Term of patent 14 years
U.S. Cl. D6—465



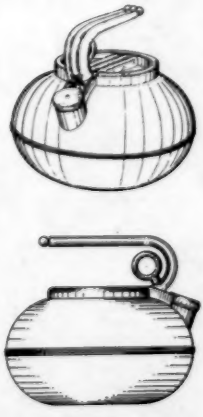
308,310
SEATING UNIT
Robert L. Wilson, Memphis, Tenn., assignor to Chromcraft Furniture Corp., Senatobia, Miss.
Filed Mar. 30, 1987, Ser. No. 31,832
Term of patent 14 years
U.S. Cl. D6—502

308,311
ORTHOPEDIC CERVICAL PILLOW
Audre C. Forsland, 860 NW 84th La., Minneapolis, Minn. 55433
Filed Jul. 1, 1987, Ser. No. 68,313
The portion of the term of this patent subsequent to Feb. 20, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D6—601



308,312
MOLD FOR FISH FILET
Samuel C. Patrinicola, 700 Bernadette Dr., Forest Hill, Md. 21050
Filed May 22, 1987, Ser. No. 52,898
Term of patent 14 years
U.S. Cl. D7—676

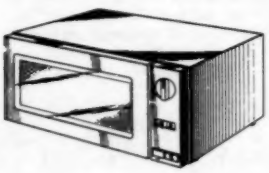
308,313
TEA KETTLE
Jane Ancona, and Bruce Ancona, both of New York, N.Y., assignors to M. Kamenstein, Inc., White Plains, N.Y.
Filed Oct. 27, 1988, Ser. No. 263,132
Term of patent 14 years
U.S. Cl. D7—322

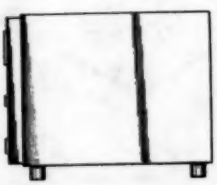


308,314
TEA KETTLE
Jane Ancona, and Bruce Ancona, both of New York, N.Y., assignors to M. Kamenstein, Inc., White Plains, N.Y.
Filed Oct. 27, 1988, Ser. No. 263,342
Term of patent 14 years
U.S. Cl. D7—322

308,315
TEA KETTLE
Jane Ancona, and Bruce Ancona, both of New York, N.Y., assignors to M. Kamenstein, Inc., White Plains, N.Y.
Filed Oct. 27, 1988, Ser. No. 263,341
Term of patent 14 years
U.S. Cl. D7—322

308,316
MICROWAVE OVEN
Masayoshi Kawaishi, and Koji Satake, both of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan
Filed Aug. 19, 1986, Ser. No. 898,009
Claims priority, application Japan, Feb. 19, 1986, 61-5900
Term of patent 14 years
U.S. Cl. D7—351

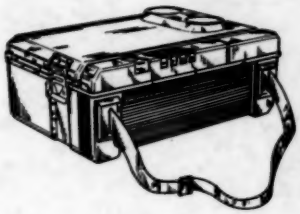




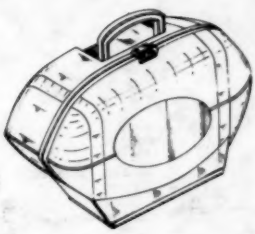
308,317
COOKING RACK
Walter Koziol, Antioch, Ill., assignor to Moerke Display & Mfg. Co., Inc., Union Grove, Wis.
Filed Mar. 3, 1988, Ser. No. 163,935
Term of patent 14 years
U.S. Cl. D7—409

308,318
TUMBLER OR SIMILAR ARTICLE
Philippe J. Durand, Les Daneaux, Chemin de la Garenne, 62510, Arques, France
Filed Oct. 6, 1987, Ser. No. 105,192
Term of patent 14 years
U.S. Cl. D7—523

308,319
PORTABLE COOLER
Alessandro Spaggiari, Correggio, Italy, assignor to Spal S.R.L., Italy
Filed Apr. 6, 1987, Ser. No. 35,135
Claims priority, application Italy, Oct. 10, 1986, 5024/86[U]
Term of patent 14 years
U.S. Cl. D7—605

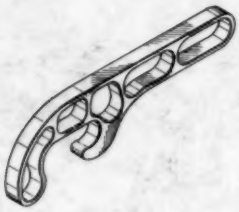


308,320
FOOTBALL LUNCHBOX
William R. Rauci, Philadelphia, Pa., assignor to Larami Corporation, Philadelphia, Pa.
Filed Jul. 5, 1988, Ser. No. 186,118
Term of patent 14 years
U.S. Cl. D7—627

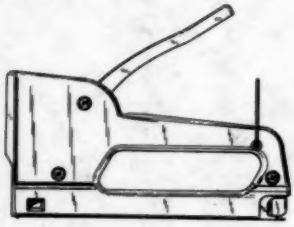


308,321
BOTTLE OPENER
Jack H. Prince, 3642 Knoxie St., San Diego, Calif. 92105
Filed Sep. 10, 1987, Ser. No. 95,477
Term of patent 14 years
U.S. Cl. D8—33

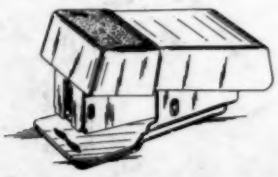
308,322
LID REMOVAL TOOL
David M. Borden, 1846 Lenape-Unionville Rd., West Chester, Pa. 19382
Filed Nov. 23, 1988, Ser. No. 276,439
Term of patent 14 years
U.S. Cl. D8—40



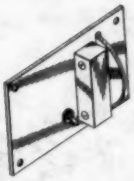
308,323
STAPLE GUN
Rudolf Wingert, W. Milford, N.J., assignor to Arrow Fastener Co., Inc., Saddle Brook, N.J.
Filed Jul. 21, 1988, Ser. No. 222,226
Term of patent 14 years
U.S. Cl. D8—49



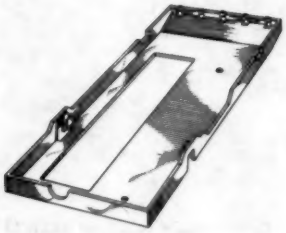
308,324
POCKET STAPLER
Daniel A. Oliver, Warwick, R.I., assignor to Stanley-Bostitch, Inc., East Greenwich, R.I.
Filed Jun. 21, 1988, Ser. No. 209,358
Term of patent 14 years
U.S. Cl. D8—50



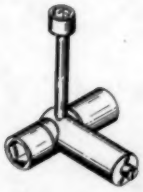
308,325
PANEL MOUNTED FISH HOOK SHARPENER
Darrell J. Lehmann, 2033 Cap Rock, Richardson, Tex. 75080
Filed Jun. 6, 1986, Ser. No. 871,625
Term of patent 14 years
U.S. Cl. D8—62



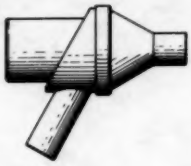
308,326
ATTACHMENT COVER FOR A PORTABLE CIRCULAR SAW
Brad Makowsky, 22362 - 1st Ave., So. Laguna, Calif. 92677
Filed Mar. 9, 1987, Ser. No. 23,471
Term of patent 14 years
U.S. Cl. D8—70



308,327
SKATEBOARD WRENCH
Aaron J. Klippel, 23941 Vista Way, Quail Valley, Calif. 92387
Filed Dec. 14, 1987, Ser. No. 133,750
Term of patent 14 years
U.S. Cl. D8—105



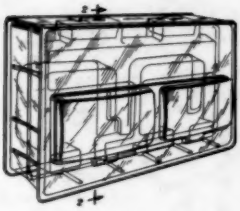
308,328
LINE DISPENSING CANNISTER FOR INSTALLING A PULL-LINE INTO A CONDUIT
Randy R. Lynn, Benton Harbor, Mich., assignor to Greenlee Textron Inc., Rockford, Ill.
Filed Sep. 15, 1986, Ser. No. 907,739
Term of patent 14 years
U.S. Cl. D8—356



308,329
DISPENSER FOR A PASTRY PRODUCT
Piero Battegazzore, Alessandria, Italy, assignor to Guala S.p.A., Alessandria, Italy
Filed Sep. 16, 1986, Ser. No. 908,091
Claims priority, application Italy, Mar. 17, 1986, 21252/86[U]
Term of patent 14 years
U.S. Cl. D9—300

308,330
COMBINED CONTAINER AND APPLICATOR
Ivor Teece, Cottingham, United Kingdom, assignor to Reckitt & Colman Products, Limited, London, England
Filed Dec. 9, 1988, Ser. No. 283,177
Claims priority, application United Kingdom, Jun. 25, 1988, 1051934
Term of patent 14 years
U.S. Cl. D9—338

308,331
RECLOSABLE PACKAGE
Daniel J. Slavin, Crystal Lake, and John R. Kreider, Carol Stream, both of Ill., assignors to Dordan Manufacturing Company, Chicago, Ill.
Filed Jun. 3, 1988, Ser. No. 202,912
Term of patent 14 years
U.S. Cl. D9—341



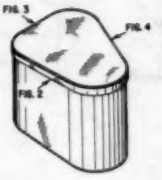
308,332
BOTTLE
Brian D. Haworth, Farnborough, England, assignor to S. C. Johnson & Son, Inc., Racine, Wis.
Filed Sep. 1, 1987, Ser. No. 91,938
Claims priority, application United Kingdom, Mar. 20, 1987, 1040898
Term of patent 14 years
U.S. Cl. D9—367

308,333
BOTTLE
Thomas B. Aldrich, III, Spring Valley, N.Y., assignor to Bristol-Myers Canada Inc., Toronto, Canada
Filed Feb. 12, 1988, Ser. No. 155,653
Claims priority, application Canada, Aug. 18, 1987, 18-08-87-7
Term of patent 14 years
U.S. Cl. D9—376

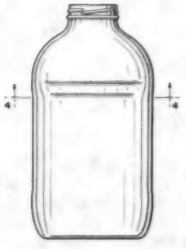
308,334
BOTTLE
Brian F. Gormley, Newhall, and Koji Takei, Los Angeles, both of Calif., assignors to Joico Laboratories, Inc., City of Industry, Calif.
Filed Mar. 17, 1988, Ser. No. 169,357
Term of patent 14 years
U.S. Cl. D9—395

308,335
BOTTLE
Ronald R. Rubinoff, Woodlands, Tex., assignor to Domaine Cellars, Inc., Houston, Tex.
Filed Mar. 15, 1988, Ser. No. 168,330
Term of patent 14 years
U.S. Cl. D9—396

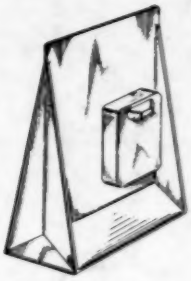
308,336
COMBINED CONTAINER WITH LID
Kurt B. Delbanco, New York, N.Y., assignor to Delmey Trading Corp., New York, N.Y.
Filed Feb. 19, 1987, Ser. No. 17,197
Term of patent 14 years
U.S. Cl. D9—402



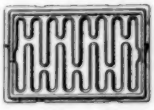
308,337
BOTTLE
Richard L. Weckman, Perrysburg, Ohio, assignor to Owens-Illinois Glass Container Inc., Toledo, Ohio
Filed Apr. 10, 1987, Ser. No. 36,817
Term of patent 14 years
U.S. Cl. D9—404



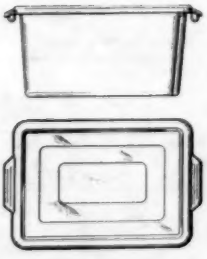
308,338
DISPLAY AND SHIPPING CONTAINER
Jen Z. Yeh, 660 S. Aberdeen, Anaheim Hills, Calif. 92807
Filed Feb. 16, 1988, Ser. No. 156,072
Term of patent 14 years
U.S. Cl. D9—415



308,339
CONTAINER
Richard Bourbonnais, Terrasse Vaudreuil, Canada, assignor to Polymos Inc., Terrasse Vaudreuil, Canada
Filed May 16, 1988, Ser. No. 194,711
Claims priority, application Canada, Jan. 19, 1988, 19-01-88-11
Term of patent 14 years
U.S. Cl. D9—424



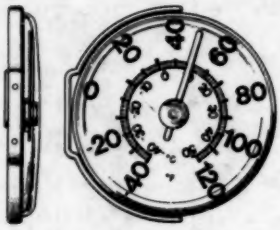
308,340
STORAGE CONTAINER
Henry Ilsen, London, and Paul Durbin, Hertford, both of England, assignors to Strata Products Ltd., London, England
Filed Mar. 25, 1988, Ser. No. 172,846
Term of patent 14 years
U.S. Cl. D9—425



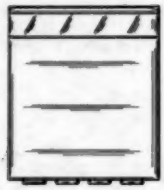
308,341
BLANK FOR PACKAGE OR THE LIKE
Stig Winterling, Yrsnögränd 4, S-126 57 Hägersten, Sweden
Filed Dec. 3, 1986, Ser. No. 937,518
Claims priority, application Sweden, Jun. 6, 1986, 86-1385
Term of patent 14 years
U.S. Cl. D9—433

308,342
CLOCK
Takei Yoshiharu, New Territories, Hong Kong, assignor to Tasca International Ltd., Kowloon, Hong Kong
Filed Sep. 4, 1986, Ser. No. 904,217
Claims priority, application United Kingdom, Apr. 16, 1986, 1633513
Term of patent 14 years
U.S. Cl. D10—22

308,343
THERMOMETER
Arthur C. Aloise, Harwinton, and Edward Ticky, Woodbury, both of Conn., assignors to Cooper Instrument Corporation, Middlefield, Conn.
Filed Aug. 3, 1987, Ser. No. 80,694
Term of patent 14 years
U.S. Cl. D10—54

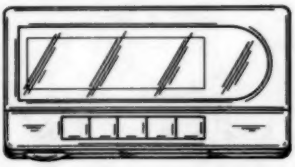


308,344
SCALE
Takehisa Nakagawa, and Keiko Matoba, both of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan
Filed Jul. 9, 1987, Ser. No. 72,572
Claims priority, application Japan, Jan. 13, 1987, 62-967; Jan. 13, 1987, 62-966
Term of patent 14 years
U.S. Cl. D10—92

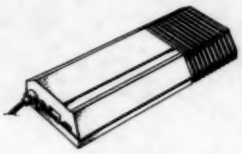


308,345
SCALE
Takehisa Nakagawa, and Keiko Matoba, both of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan
Filed Jul. 9, 1987, Ser. No. 71,704
Claims priority, application Japan, Jan. 13, 1987, 62-963
Term of patent 14 years
U.S. Cl. D10—92

308,346
REMOTE CONTROLLER FOR SCALE
Takehisa Nakagawa; Keiko Matoba, and Kouji Nishida, all of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan
Filed Jul. 9, 1987, Ser. No. 72,001
Claims priority, application Japan, Jan. 13, 1987, 62-962
Term of patent 14 years
U.S. Cl. D10—94



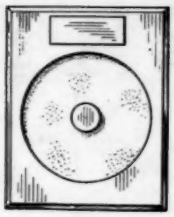
308,347
ULTRASONIC OBJECT DETECTION DEVICE
Earl L. Bryenton; Eric Hillmer, both of Ottawa, and Robert J. Arnott, Carleton Place, all of Canada, assignors to E. L. Bryenton & Associates, Inc., Ontario, Canada
Filed Dec. 22, 1986, Ser. No. 944,825
Term of patent 14 years
U.S. Cl. D10—106



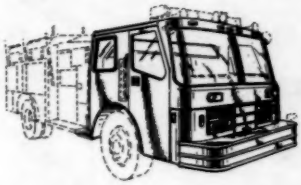
308,348
HELICALLY-SHAPED EARRING
Norbert Leopoldi, Chicago, Ill., assignor to The Cloverline, Inc., Chicago, Ill.
Filed Feb. 5, 1987, Ser. No. 11,234
Term of patent 14 years
U.S. Cl. D11—43

308,349
EARRING OR SIMILAR ARTICLE
Paolo Bulgari, Rome, Italy, assignor to Partecipazioni Bulgari S.p.A., Rome, Italy
Filed Dec. 5, 1988, Ser. No. 280,265
Claims priority, application Int'l Pat. Institute, Jun. 3, 1988, DM/011089
Term of patent 14 years
U.S. Cl. D11—75

308,350
RECORD HANGER PLAQUE
David L. England, 2016 N. Kingston Pl., Tulsa, Okla. 74115
Filed Apr. 28, 1986, Ser. No. 858,234
Term of patent 14 years
U.S. Cl. D11—132

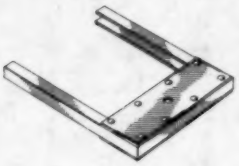


308,351
CAB FOR FIRE TRUCKS
H. Dewey Fry, Stilwell, Kans.; Harold E. King, Blue Springs, Mo.; Mitchell H. Babkes, and Ben C. Baugh, both of Wichita, Kans., assignors to Ottawa Truck Company, Ottawa, Kans.
Filed Aug. 3, 1987, Ser. No. 80,588
Term of patent 14 years
U.S. Cl. D12—13



308,352
SLEEVE FOR THE ARM OF A WINDSCREEN WIPER
John M. Bradley, Leighton House, 37 Leighton Street, Woburn, Bedfordshire, MK7 9PH, Great Britain
Filed Dec. 2, 1988, Ser. No. 279,446
Claims priority, application United Kingdom, Jul. 20, 1988, 1052444
Term of patent 14 years
U.S. Cl. D12—155

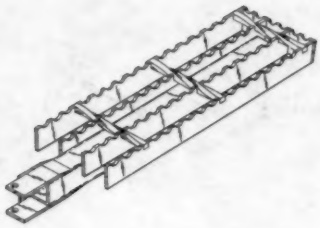
308,353
MOTORCYCLE HITCH
Marshall T. Allen, 7344 W. Peoria Ave., Space #1, Peoria, Ariz. 85345
Filed Apr. 4, 1988, Ser. No. 177,027
Term of patent 14 years
U.S. Cl. D12—162

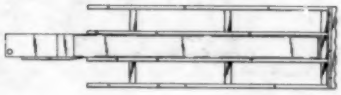


308,354
MUD FLAP BRACE
Grady Thomas, Jr., 4775 Royal Dr., Post Falls, Id. 83854
Filed Aug. 22, 1988, Ser. No. 234,823
Term of patent 14 years
U.S. Cl. D12—185

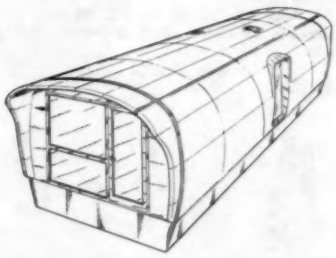
308,355
PORTABLE SUN VISOR
Stuart C. Spoto, 3620 La Habra Way, Sacramento, Calif. 95864
Filed Nov. 25, 1988, Ser. No. 276,512
Term of patent 14 years
U.S. Cl. D12—191

308,356
COMBINATION STEP AND BOOT CLEANER
Ronald L. Strahan, 2416 Appleway, Edmond, Okla. 73013
Filed Sep. 25, 1986, Ser. No. 911,629
Term of patent 14 years
U.S. Cl. D12—203

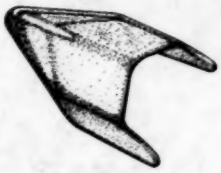




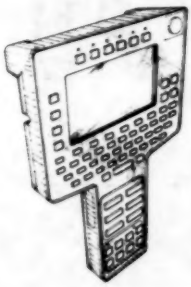
308,357
HOUSE BOAT
Lars Hammerö, Viken, Sweden, assignor to Turinova Aktiebolag, Upsala, Sweden
Filed Nov. 29, 1988, Ser. No. 277,222
Claims priority, application Sweden, May 30, 1988, 881322
Term of patent 14 years
U.S. Cl. D12—315



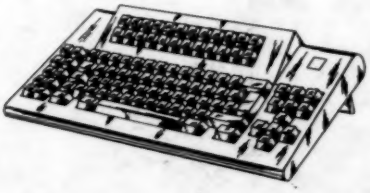
308,358
TOWLINE DEPRESSOR
Barry B. Moore, Kingston Rd., Danville, N.H. 03189
Filed Aug. 12, 1986, Ser. No. 895,748
Term of patent 14 years
U.S. Cl. D12—317



308,359
PENDANT CONTROL HOUSING
John C. Lauchner; Joseph W. Schnelle, both of Greenwood, S.C.; James W. Braun, Cincinnati, Ohio; Keith R. Galloway, West Chester, Ohio, and Jack E. Schenkel, Mason, Ohio, assignors to Cincinnati Milacron Inc., Cincinnati, Ohio
Filed Sep. 30, 1988, Ser. No. 252,359
Term of patent 14 years
U.S. Cl. D3—123

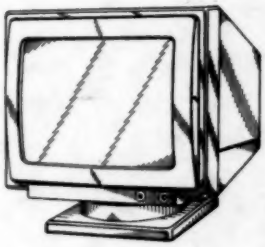


308,360
INFORMATION ENTRY KEYBOARD OR THE LIKE
David L. Schaum, Woodstock, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.
Filed Feb. 13, 1987, Ser. No. 14,733
Term of patent 14 years
U.S. Cl. D14—100

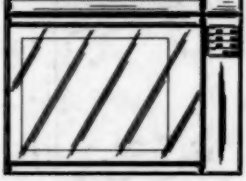


308,361
OPTICAL MEMORY DISK DRIVE
Masakazu Nakamura, Hyogo; Yoshihiko Sugiyama, Nara, and Susumu Yamamoto, Osaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan
Filed Jul. 8, 1987, Ser. No. 71,223
Claims priority, application Japan, Mar. 6, 1987, 62-8621
Term of patent 14 years
U.S. Cl. D14—109

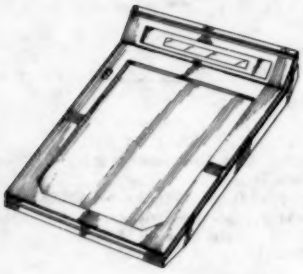
308,362
DISPLAY
Ettore Sottsass, Milan, Italy, assignor to Ing. C. Olivetti & C., S.p.A., Ivrea, Italy
Filed Dec. 7, 1987, Ser. No. 129,083
Claims priority, application Italy, Jun. 15, 1987, 53418/87[U]
Term of patent 14 years
U.S. Cl. D14—113



308,363
DATA DISPLAY FOR COMPUTER
Kazuhiko Ashihara, Osaka, Japan, assignor to Sharp Corporation, Osaka, Japan
Filed Apr. 21, 1988, Ser. No. 184,485
Claims priority, application Japan, Oct. 23, 1987, 62-43548
Term of patent 14 years
U.S. Cl. D14—113

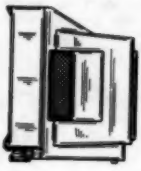


308,364
DATA ENTRY DIGITIZING TABLET
Tom Beasley, Jr.; Peter F. Milly, both of Huntsville, Ala., and Michael B. Tybergein, Marietta, Ga., assignors to Data Entry Systems, Inc., Huntsville, Ala.
Filed Nov. 10, 1987, Ser. No. 119,107
Term of patent 14 years
U.S. Cl. D14—114

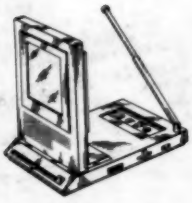


308,365
TELEVISION RECEIVER
Kanta Takechi, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed Dec. 23, 1988, Ser. No. 288,812
Claims priority, application Japan, Jun. 28, 1988, 63-25463
Term of patent 14 years
U.S. Cl. D14—126

308,366
TELEVISION SET
Tomitaro Saito, and Takeo Hashiba, both of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan
Filed Jun. 6, 1988, Ser. No. 203,057
Claims priority, application Japan, Dec. 9, 1987, 62-50331
Term of patent 14 years
U.S. Cl. D14—126

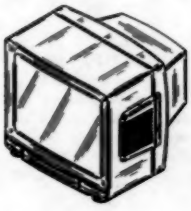


308,367
POCKET TELEVISION RECEIVER
Michihiro Nakahara, Koshigaya; Shinji Saito, Kawasaki, and Takeshi Ikemura, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed Jun. 22, 1988, Ser. No. 210,300
Claims priority, application Japan, Dec. 24, 1987, 62-52384
Term of patent 14 years
U.S. Cl. D14—126



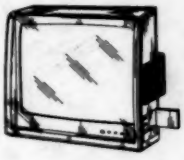
308,368
TELEVISION RECEIVER
Tatsuyuki Mikami, Ichikawa, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed Dec. 15, 1988, Ser. No. 284,486
Claims priority, application Japan, Jun. 17, 1988, 63-23856
Term of patent 14 years
U.S. Cl. D14—126

308,369
TELEVISION SET
Tomitaro Saito; Yoshito Fujii, and Tohru Ohtani, all of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan
Filed Nov. 14, 1988, Ser. No. 270,309
Claims priority, application Japan, May 19, 1988, 63-19814
Term of patent 14 years
U.S. Cl. D14—126

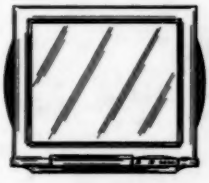


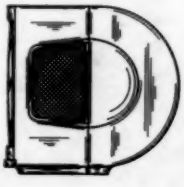
308,370
TELEVISION RECEIVER
Masazumi Shiraki, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed Jun. 22, 1988, Ser. No. 210,301
Claims priority, application Japan, Dec. 24, 1987, 62-52386
Term of patent 14 years
U.S. Cl. D14—126

308,371
TELEVISION RECEIVER
Masaru Shinoda, Tokyo, Japan, and Franco Mantegazza, Turin, Italy, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed Jun. 21, 1988, Ser. No. 210,611
Claims priority, application Japan, Dec. 22, 1987, 62-52010
Term of patent 14 years
U.S. Cl. D14—126

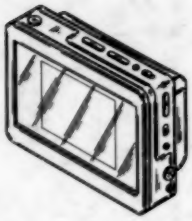


308,372
TELEVISION SET
Tomitaro Saito; Yoshito Fujii, and Tohru Ohtani, all of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan
Filed Apr. 28, 1988, Ser. No. 187,653
Claims priority, application Japan, Oct. 30, 1987, 62-44578
Term of patent 14 years
U.S. Cl. D14—126



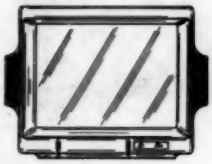


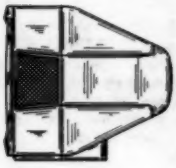
308,373
TELEVISION SET
Osamu Shimizu, Osaka, Japan, assignor to Sharp Corporation, Osaka, Japan
Filed Nov. 14, 1988, Ser. No. 271,074
Claims priority, application Japan, Jun. 2, 1988, 63-21771
Term of patent 14 years
U.S. Cl. D14—126



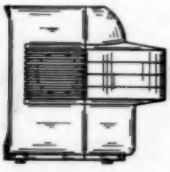
308,374
TELEVISION SET
Tomitaro Saito, and Tohru Ohtani, both of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan
Filed Feb. 6, 1987, Ser. No. 12,219
Claims priority, application Japan, Aug. 8, 1986, 61-31271
Term of patent 14 years
U.S. Cl. D14—126

308,375
TELEVISION SET
Tomitaro Saito; Yoshito Fujii, and Tohru Ohtani, all of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan
Filed Apr. 28, 1988, Ser. No. 187,420
Claims priority, application Japan, Oct. 30, 1987, 62-44579
Term of patent 14 years
U.S. Cl. D14—126



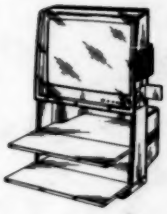


308,376
TELEVISION SET
Harumi Sakamoto, and Manabu Hokazono, both of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan
Filed Jun. 6, 1988, Ser. No. 203,056
Claims priority, application Japan, Dec. 11, 1987, 62-50831
Term of patent 14 years
U.S. Cl. D14—126

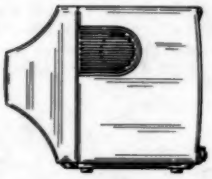


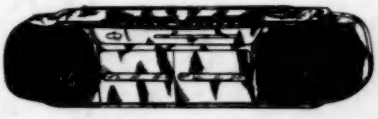
308,377
TELEVISION SET
Tomitaro Saito, and Harumi Sakamoto, both of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan
Filed Jun. 8, 1988, Ser. No. 204,558
Claims priority, application Japan, Dec. 11, 1987, 62-50832
Term of patent 14 years
U.S. Cl. D14—126

308,378
TELEVISION RECEIVER
Masaru Shinoda, Tokyo, Japan, and Franco Mantegazza, Turin, Italy, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed Jun. 21, 1988, Ser. No. 210,612
Claims priority, application Japan, Dec. 22, 1987, 62-52009
Term of patent 14 years
U.S. Cl. D14—133



308,379
COMBINED TAPE RECORDER AND RADIO RECEIVER
Noriteru Gato, Osaka, Japan, assignor to Sanyo Electric Co., Ltd., Osaka, Japan
Filed Oct. 26, 1987, Ser. No. 113,769
Claims priority, application Japan, Apr. 27, 1987, 62-16524
Term of patent 14 years
U.S. Cl. D14—163

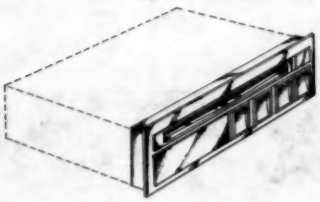




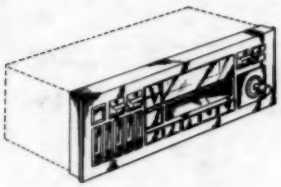
308,380
REMOTE CONTROLLER
Kae S. Shim, Seoul, Rep. of Korea, assignor to Gold Star Co., Ltd., Seoul, Rep. of Korea
Filed Oct. 14, 1987, Ser. No. 108,804
Claims priority, application Rep. of Korea, Apr. 21, 1987, 5748/1987
Term of patent 14 years
U.S. Cl. D14—218

308,381
AUTOMATIC TELEPHONE DIALER BASE
Ronald J. Dehnert, 13309 SE. 196th, Renton, Wash. 98058
Filed Oct. 6, 1988, Ser. No. 254,294
Term of patent 14 years
U.S. Cl. D14—245

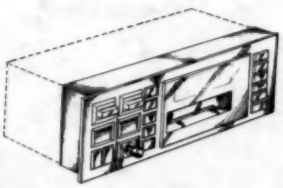
308,382
CONTROL PANEL FOR A COMPACT DISK PLAYER
Michael G. Moore, Rochester; Kurt M. Straub, Livonia, and Ronald Mills, Birmingham, all of Mich., assignors to Chrysler Corporation, Highland Park, Mich.
Filed Mar. 19, 1987, Ser. No. 27,966
Term of patent 14 years
U.S. Cl. D14—258



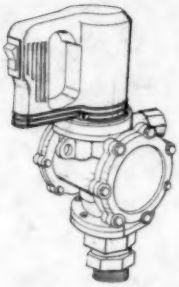
308,383
CONTROL PANEL FOR A COMBINED VEHICULAR RADIO RECEIVER, CASSETTE PLAYER, DIGITAL CLOCK AND GRAPHIC EQUALIZER
Richard Megregian, Farmington Hills; Michael G. Moore, Rochester, and L. John Ozark, Grosse Pointe Woods, all of Mich., assignors to Chrysler Corporation, Highland Park, Mich.
Filed Mar. 19, 1987, Ser. No. 27,965
Term of patent 14 years
U.S. Cl. D14—258

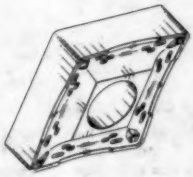


308,384
CONTROL PANEL FOR A COMBINED VEHICULAR RADIO RECEIVER AND CASSETTE PLAYER
James Van Hout, Auburn Hills; Michael G. Moore, Rochester, and Thomas C. Slanec, Grosse Pointe Woods, all of Mich., assignors to Chrysler Corporation, Highland Park, Mich.
Filed Mar. 19, 1987, Ser. No. 27,964
Term of patent 14 years
U.S. Cl. D14—258

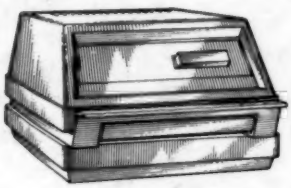


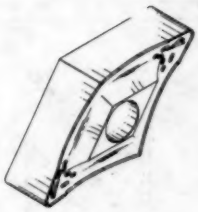
308,385
PUMP ASSEMBLY FOR HIGH-VISCOSITY LIQUID PRODUCTS
Frank J. Russold, and Fred L. Laqua, both of Wichita, Kans., assignors to Great Plains Industries, Inc., Wichita, Kans.
Filed Nov. 10, 1987, Ser. No. 118,964
Term of patent 14 years
U.S. Cl. D15—7



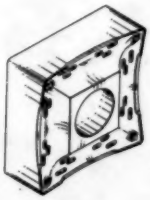


308,386
CIRCLE CUTTING MACHINE
Austin H. Munson, Waunakee, and Daniel R. Bullis, Jr., Madison, both of Wis., assignors to Badge-A-Minit, Ltd., LaSalle, Ill.
Filed Jun. 3, 1987, Ser. No. 57,840
Term of patent 14 years
U.S. Cl. D15—127



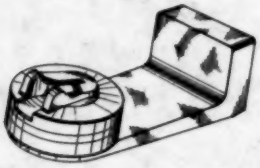


308,387
CUTTING TOOL INSERT
Eugen Valerius, Alter Anspacher, Fed. Rep. of Germany, assignor to Kennametal Inc., Latrobe, Pa.
Filed Jan. 22, 1988, Ser. No. 147,008
Term of patent 14 years
U.S. Cl. D15—130

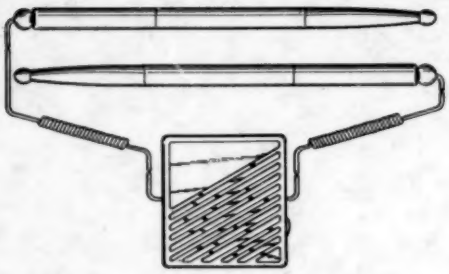


308,388
BINOCULAR
Donald E. Addy, and Byron M. Saper, both of Kansas City, Mo., assignors to Jason Empire, Inc., Overland Park, Kans.
Filed May 2, 1988, Ser. No. 189,462
Term of patent 14 years
U.S. Cl. D16—133

308,389
CAMERA MOUNT
Donald N. Horn, Cold Spring Harbor, and Rein Randmae, Fort Salonga, both of N.Y., assignors to Vicon Industries, Inc., Melville, N.Y.
Filed Mar. 5, 1987, Ser. No. 22,337
Term of patent 14 years
U.S. Cl. D16—242

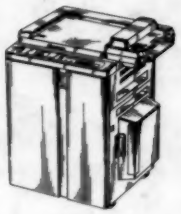


308,390
ELECTRONIC DRUM
Melvin Kennedy, 2 Fifth Ave., New York, N.Y. 10011, and Avi Arad, 6 Minuteman Hill, Westport, Conn. 06880
Continuation-in-part of Ser. No. 173,640, Mar. 25, 1988. This application Aug. 15, 1988, Ser. No. 232,362
Term of patent 14 years
U.S. Cl. D17—22



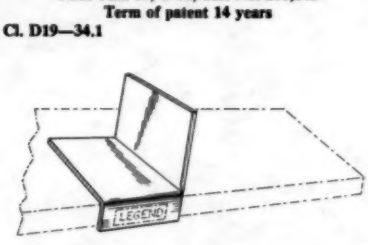
308,391
ELECTRONIC CALCULATOR
Hiroshi Sakaguchi, and Katsuhiro Iida, both of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan
Filed Jan. 28, 1987, Ser. No. 7,904
Claims priority, application Japan, Jul. 28, 1986, 61-29702
Term of patent 14 years
U.S. Cl. D18—7

308,392
ELECTRONIC COPYING MACHINE
Kunio Hara, Chiba; Shin-ichi Hiroki, Tokyo, and Atsushi Tani, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed May 29, 1987, Ser. No. 55,752
Claims priority, application Japan, Dec. 16, 1986, 61-49518
Term of patent 14 years
U.S. Cl. D18—38

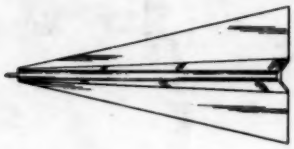


308,393
COPIER CONTROL DEVICE
Mikio Kosako, Osaka, Japan, assignor to Sharp Corporation, Osaka, Japan
Filed Nov. 26, 1986, Ser. No. 935,537
Claims priority, application Japan, May 26, 1986, 61-20405
Term of patent 14 years
U.S. Cl. D18—41

308,394
SHELF DIVIDER
Henry D. Smith, 4650 Industrial Dr., Springfield, Ill. 62703
Filed Jun. 20, 1988, Ser. No. 208,645
Term of patent 14 years
U.S. Cl. D19—34.1



308,395
WRITING INSTRUMENT
Gian L. Mori, St.da del Cascinotto 119, Torino, Italy
Filed Jul. 10, 1987, Ser. No. 72,239
Term of patent 14 years
U.S. Cl. D19—42

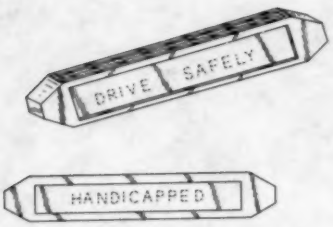


308,396
WRITING INSTRUMENT
Shungo Sekiguchi, Naritahigashi, Japan, assignor to Pentel Kabushiki Kaisha, Tokyo, Japan
Filed Feb. 25, 1987, Ser. No. 18,574
Claims priority, application Japan, Aug. 27, 1986, 61-33534
Term of patent 14 years
U.S. Cl. D19—49

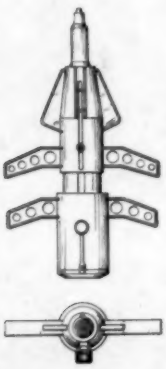
308,397
CAMPAIGN BUTTON
Gene Friedman, New York, N.Y., assignor to Margene, Inc., New York, N.Y.
Filed Apr. 13, 1987, Ser. No. 37,457
Term of patent 14 years
U.S. Cl. D20—28

308,398
SIGN
Frank Sartz, 901 Merchants Road La., Knoxville, Tenn. 37912
Filed Oct. 8, 1986, Ser. No. 916,994
Term of patent 14 years
U.S. Cl. D20—31

308,399
DISPLAY SIGN FOR AUTOMOBILE WINDOWS
Eugene Y. Mori, 5444 Via Campo, Los Angeles, Calif. 90022
Filed Jan. 21, 1987, Ser. No. 5,740
Term of patent 14 years
U.S. Cl. D20—35

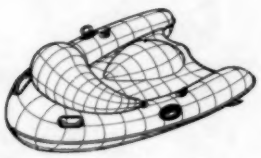


308,400
TOY GUN
Giampiero Ferri, Via Vecchia Fiesolana No. 74, 50016 San Domenico, Fiesole, Firenze, Italy
Filed Jan. 24, 1989, Ser. No. 301,260
Claims priority, application Italy, Jul. 27, 1988, 11698/88[U]
Term of patent 14 years
U.S. Cl. D21—146



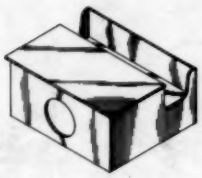
308,401
REVERSIBLE DOLL
Patty J. Dinelli, 1851 Pescadero Rd., Pescadero, Calif. 94060
Filed Jan. 16, 1987, Ser. No. 3,909
Term of patent 14 years
U.S. Cl. D21—149

308,402
SURFING BOAT
Herry Chang, No. 371-7, Hsin Ming Road, Nei Hu District, Taipei, Taiwan
Filed Mar. 28, 1988, Ser. No. 179,891
Term of patent 14 years
U.S. Cl. D21—237

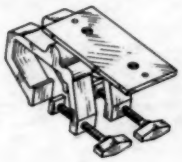


308,403
INFLATABLE TANNING TUB
James W. LaForce, Jr., P.O. Box 6100, Chico, Calif. 95927
Filed Aug. 23, 1988, Ser. No. 235,212
Term of patent 14 years
U.S. Cl. D21—237

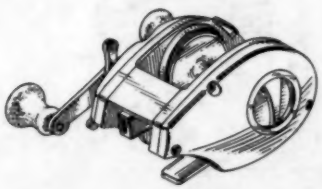
308,404
CHILD PLAY STRUCTURE
William J. Goodwin, Rte. 4, Wills Point, Tex. 75169
Filed Jun. 11, 1987, Ser. No. 60,423
Term of patent 14 years
U.S. Cl. D21—240



308,405
DOWNRIGGER MOUNTING BRACKET
Ronald L. Yoder, Topeka, Ind., assignor to Universal Consolidated Methods, Inc., Topeka, Ind.
Filed Mar. 31, 1988, Ser. No. 176,400
Term of patent 14 years
U.S. Cl. D22—134

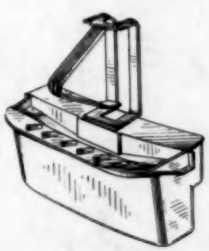


308,406
BAITCAST FISHING REEL
Richard J. Robbins, Derby, Kans., assignor to Zebco Corporation, Tulsa, Okla.
Filed Jan. 26, 1988, Ser. No. 149,071
Term of patent 14 years
U.S. Cl. D22—140

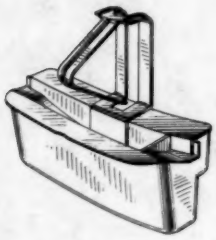


308,407
LIQUID TANK FOR USE IN THE COOLING CYCLE OF AN AIR CONDITIONING DEVICE OR THE LIKE
Yoshikazu Takamatsu, Tokyo, Japan, assignor to Nihon Radiator Co., Ltd., Tokyo, Japan
Filed Jan. 15, 1988, Ser. No. 144,447
Claims priority, application Japan, Dec. 11, 1987, 62-50431
Term of patent 14 years
U.S. Cl. D23—205

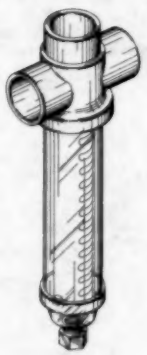
308,408
TOILET BOWL DEODORANT HOLDER
Earl Hoyt, Franklin Lakes, and Manharbhai K. Patel, Saddle Brook, both of N.J., assignors to Airwick Industries, Inc., Carlstadt, N.J.
Filed Oct. 20, 1988, Ser. No. 260,374
Term of patent 14 years
U.S. Cl. D23—208



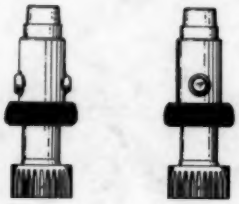
308,409
TOILET BOWL DEODORANT HOLDER
Earl Hoyt, Franklin Lakes, and Manharbhai K. Patel, Saddle Brook, both of N.J., assignors to Airwick Industries, Inc., Carlstadt, N.Y.
Filed May 27, 1988, Ser. No. 199,574
Term of patent 14 years
U.S. Cl. D23—208



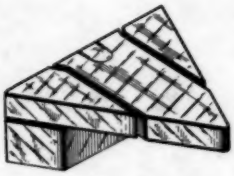
308,410
COMBINED FILTER UNIT AND COUPLING ELEMENT
Bryan G. Russell, Satellite Beach, and Rodney J. Busto, Melbourne, both of Fla., assignors to Vu-Flow Filters Company, Melbourne, Fla.
Filed Jun. 23, 1988, Ser. No. 210,646
Term of patent 14 years
U.S. Cl. D23—209



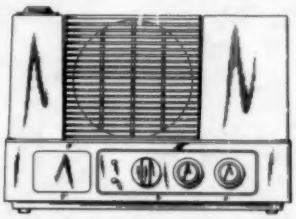
308,411
HOSE NOZZLE
James G. Allemann, Orange, and Roger L. Hildwein, West Covina, both of Calif., assignors to Rain Bird Consumer Products Mfg. Corp., Duarte, Calif.
Filed Sep. 16, 1986, Ser. No. 908,171
Term of patent 14 years
U.S. Cl. D23—229



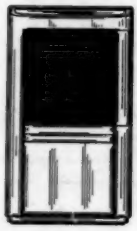
308,412
FAUCET
Joseph Strignano, New York, N.Y., assignor to I.W. Industries, Melville, N.Y.
Filed Apr. 16, 1987, Ser. No. 39,649
Term of patent 14 years
U.S. Cl. D23—241



308,413
COMBINED HUMIDIFIER AND FAN HEATER UNIT
Man K. Wong, Quarry Bay, Hong Kong, assignor to Well Men Industrial Co. Ltd., Hong Kong
Filed Jan. 29, 1987, Ser. No. 8,918
Claims priority, application United Kingdom, Sep. 18, 1986, 1036787
Term of patent 14 years
U.S. Cl. D23—356

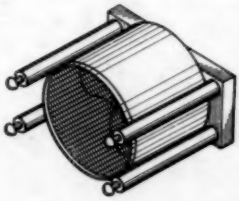


308,414
COMBINED DEHUMIDIFIER AND AIR CLEANER
Kendo Makihara, Osaka, Japan, assignor to Sharp Corporation, Osaka, Japan
Filed Mar. 10, 1988, Ser. No. 166,171
Claims priority, application Japan, Sep. 21, 1987, 62-38421
Term of patent 14 years
U.S. Cl. D23—359

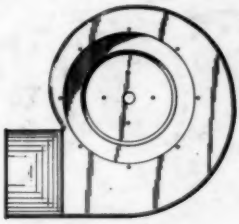


308,415
ENVIRONMENTAL CONTROL DISPENSER
Walter A. Kunze, Southington, Conn., assignor to Waterbury Companies, Inc., Waterbury, Conn.
Filed Jul. 6, 1987, Ser. No. 70,278
Term of patent 14 years
U.S. Cl. D23—366

308,416
SOLAR POWERED VENTILATING FAN FOR WELDING HELMETS
Stuart R. Brumbach, 107 Pleasantview Ter., New Cumberland, Pa. 17070
Filed Aug. 21, 1987, Ser. No. 87,901
Term of patent 14 years
U.S. Cl. D23—370

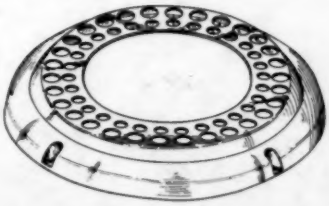


308,417
AIR BLOWER HOUSING
James A. Belanger; Robert J. Wentworth, both of Northville; Graham J. Astley, Novi, and Barry S. Turner, Livonia, all of Mich., assignors to Belanger, Inc., Northville, Mich.
Filed Apr. 1, 1987, Ser. No. 32,651
Term of patent 14 years
U.S. Cl. D23—383

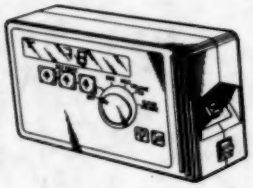


308,418
HOUSING FOR AN ELECTRIC STORAGE HEATER
Richard J. Lane, Stone, England, assignor to Creda Limited, Stroke-on-Trent, United Kingdom
Filed Jul. 28, 1987, Ser. No. 78,866
Claims priority, application United Kingdom, Feb. 7, 1987, 1039826
Term of patent 14 years
U.S. Cl. D23—395

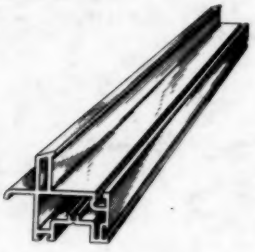
308,419
COVER PLATE FOR A CEILING FAN
Jean C. Mason, Hollywood, Calif., assignor to Casablanca Fan Company, Inc., City of Industry, Calif.
Filed Jun. 1, 1987, Ser. No. 56,752
Term of patent 14 years
U.S. Cl. D23—411



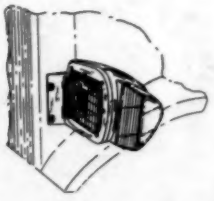
308,420
COMPACT DUMP UNIT FOR ENTERNAL FLUID DELIVERY
Mark G. Frantz, New York, N.Y., assignor to Frantz Medical Development Ltd., New York, N.Y.
Filed Jun. 16, 1987, Ser. No. 63,275
Term of patent 14 years
U.S. Cl. D24—17



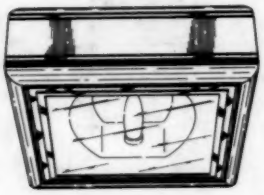
308,421
WINDOW COMPONENT EXTRUSION
Dennis Westphal, Galva, and Jonathan Piles, McPherson, both of Kans., assignors to CertainTeed Corporation, Valley Forge, Pa.
Filed Sep. 12, 1989, Ser. No. 406,751
Term of patent 14 years
U.S. Cl. D25—124



308,422
HEADLIGHT FOR A TRUCK
Ross Sasamura, Fremont, Calif., assignor to Paccar Inc., Bellevue, Wash.
Filed Sep. 11, 1987, Ser. No. 95,544
Term of patent 14 years
U.S. Cl. D26—35

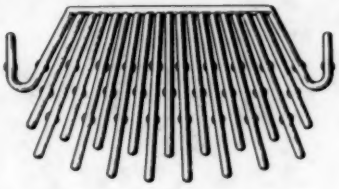


308,423
STREET-LAMP
Guy Galipeau, and Jean F. Simard, both of Montreal, Canada, assignors to Lumec, Inc., Boisbriand, Canada
Filed Jan. 8, 1987, Ser. No. 1,558
Claims priority, application Canada, Aug. 19, 1986, 19-08-86-12
Term of patent 14 years
U.S. Cl. D26—67

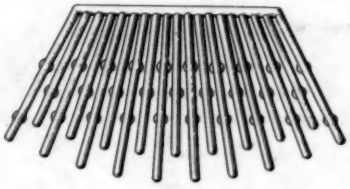


308,424
DESK LAMP
Kouji Nishida, Osaka, Japan, assignor to Sharp Corporation, Osaka, Japan
Filed Feb. 25, 1988, Ser. No. 160,086
Claims priority, application Japan, Sep. 11, 1987, 62-37402
Term of patent 14 years
U.S. Cl. D26—107

308,425
HAIR ORNAMENT
Michel Drouin, Place Benoit Raclet, 71570 Romaneche Thorins, and Gilles Morand, Rue Donant, 01250 Ceyzeriat, both of France
Filed Apr. 18, 1988, Ser. No. 182,831
Claims priority, application France, Oct. 16, 1987, 87 6046
Term of patent 14 years
U.S. Cl. D28—41



308,426
HAIR ORNAMENT
Michel Drouin, Place Benoit Raclet, 71570 Romaneche Thorins, and Gilles Morand, Rue Dunant, 01250 Ceyzeriat, both of France
Filed Apr. 18, 1988, Ser. No. 182,832
Term of patent 14 years
U.S. Cl. D28—41

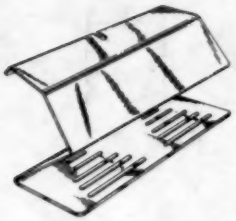


308,427
COMBINED RAZOR AND BLADE COVER THEREOF
Kenneth Gyllerstrom, Athens, Greece, assignor to Bic Corporation, Milford, Conn.
Filed Jan. 11, 1988, Ser. No. 142,776
Claims priority, application France, Jul. 9, 1987, 87 4086
Term of patent 14 years
U.S. Cl. D28—46

308,428
COSMETIC CASE
Dominick A. Sarica, Kenilworth, N.J., assignor to Pfizer, Inc., New York, N.Y.
Filed Oct. 20, 1986, Ser. No. 921,015
Term of patent 14 years
U.S. Cl. D28—76

308,429
PORTABLE PET CARRIER
Ralph VanSkiver, Arlington, Tex., assignor to Doskocil Manufacturing Company, Inc., Arlington, Tex.
Filed Oct. 26, 1988, Ser. No. 262,679
Term of patent 14 years
U.S. Cl. D30—109

308,430
SPLASH GUARD FOR CLEANING PAINT ROLLERS
Terence K. O'Shea, 3 Primwood Street, Kingston, Old 4114, Australia
Filed Jul. 10, 1986, Ser. No. 884,745
Claims priority, application Australia, May 20, 1986, 5252/86
Term of patent 14 years
U.S. Cl. D32—35



308,431
WALL HAMPER
Pamela Phelps, 30 Quentin Ave., New Brunswick, N.J. 08901, and Roberta White, 511 Algair Ave., North Brunswick, N.J. 08902
Filed May 13, 1988, Ser. No. 193,638
Term of patent 14 years
U.S. Cl. D32—37

308,432
WALL HAMPER
Roberta White, 511 Algair Ave., North Brunswick, N.J. 08902, and Pamela Phelps, 30 Quentin Ave., New Brunswick, N.J. 08901
Filed May 13, 1988, Ser. No. 193,631
Term of patent 14 years
U.S. Cl. D32—37

308,433
CARBIDE SCRAPER
John Longman, 9902 N. Canyon Rd., Pleasant Grove, Vt. 84062
Filed Aug. 13, 1987, Ser. No. 84,737
Term of patent 14 years
U.S. Cl. D32—49

308,434

OUTDOOR DISPLAY CABINET

John G. Dewees, Morristown, and Rickey Martins, Lynohurst, both of N.J., assignors to Champion Spark Plug Company, Toledo, Ohio

Filed Dec. 29, 1986, Ser. No. 947,581
Term of patent 14 years

U.S. Cl. D34—25

LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 5TH DAY OF JUNE, 1990

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. Ahlstrom Corporation: *See*—
Miettinen, Lauri O., 4,930,387, Cl. 83-508.300.

A.D.R.I.A.: *See*—
Bourgeois, Claude; and Colin, Jean-Yves, 4,931,185, Cl. 210-636.000.

A. O. Smith Corporation: *See*—
Schurter, Robert M., 4,930,204, Cl. 29-419.200.

Abbey, Christopher P.: *See*—
Bawa, Harinder S.; and Abbey, Christopher P., 4,930,276, Cl. 52-211.000.

Abbott Laboratories: *See*—
Berger-Neel, Bonnie; Gershon, Beth K.; and Groff, John P., 4,931,446, Cl. 514-254.000.
Kundu, Samar K., 4,931,404, Cl. 436-128.000.

Abe, Eiichi: *See*—
Takeda, Hiroaki; Ishida, Masato; Abe, Eiichi; and Sato, Isamu, 4,931,882, Cl. 358-474.000.

Abe, Masahiro: *See*—
Kamitake, Takashi; Kawamura, Shin-ichi; and Abe, Masahiro, 4,931,979, Cl. 364-745.000.

Abe, Mitsue, to NEC Corporation. Data processor capable of accessing the content of internal counters at a high speed. 4,931,983, Cl. 364-900.000.

Abe, Shinichi: *See*—
Osawa, Kouichi; Shibata, Norio; and Abe, Shinichi, 4,930,479, Cl. 123-436.000.

Abendroth Corullo Stephenson, Inc.: *See*—
Abendroth, Thomas W., 4,930,280, Cl. 52-403.000.

Abendroth, Thomas W., to Abendroth Corullo Stephenson, Inc. Flooring system with metal strips. 4,930,280, Cl. 52-403.000.

Abiomed, Inc.: *See*—
Barak, Jacob H., 4,930,674, Cl. 227-179.000.

Abplanalp, Heinz, to Tecan AG Analytische Instrumente. Photometric analysis equipment. 4,931,402, Cl. 435-291.000.

Abramson, Monte, to Southern Integrity, Inc. Protection system. 4,931,770, Cl. 340-541.000.

Absorption Corp.: *See*—
Phillips, Christopher R., 4,931,139, Cl. 162-100.000.

Abushanab, Ellie, to Board of Governors for Higher Education, State of Rhode Island and Providence Plantations, The. Chiral glycerol derivatives. 4,931,575, Cl. 549-453.000.

Abuyama, Yasuo; Ide, Fumito; Hamanaka, Osamu; and Sanbayashi, Takeshi, to Kabushiki Kaisha Toshiba. Removable developing unit for an electrostatic copier and locking device therefor. 4,931,837, Cl. 355-245.000.

Academy of Applied Science, Inc.: *See*—
Chien, James C. W., 4,931,427, Cl. 505-1.000.

Acarlar, Muvaffak S., to AT&T Bell Laboratories. Hybrid package arrangement. 4,930,857, Cl. 350-96.200.

Acme Manufacturing Company: *See*—
Carlson, Don F., 4,930,258, Cl. 51-5.00R.

Adachi, Hideyuki: *See*—
Takehana, Sakae; Ueda, Yasuhiro; Gotanda, Masakazu; Sakurai, Tomohisa; and Adachi, Hideyuki, 4,930,494, Cl. 128-4.000.

Adachi, Kozi: *See*—
Anzawa, Norio; Yazaki, Hisashi; Adachi, Kozi; Watanabe, Naoki; Miyabe, Shuichi; and Kitazawa, Kozo, 4,931,108, Cl. 148-18.000.

Adachi, Yuuma; Nakajima, Nobuyoshi; and Ishida, Masamitsu, to Fuji Photo Film Co., Ltd. Method of adjusting radiation image read-out conditions. 4,931,644, Cl. 250-327.200.

Adam, Norbert; and Wiedermann, Rolf, to Bayer Aktiengesellschaft. Process for the production of foams based on aromatic isocyanates using $MG(OH)_2$ and the foams produced thereby. 4,931,481, Cl. 521-123.000.

ADC Telecommunications, Inc.: *See*—
Werdin, David A.; and Henke, Reinhold, 4,930,214, Cl. 29-830.000.

Addison, Oswald G., Jr. Timing device for skiers. 4,930,810, Cl. 280-821.000.

ADE Corporation: *See*—
Palleiko, Benjamin, 4,931,962, Cl. 364-550.000.

Adkins, Donald E. Surface, subsurface, continuous feed moisture maintenance system apparatus and method. 4,930,934, Cl. 405-37.000.

Adrian, Renate: *See*—
Dany, Franz-Josef; Klassen, Horst; Adrian, Renate; Prell, Hedwig; and Kalteyer, Gerhard, 4,931,272, Cl. 424-49.000.

Advanced Chemical Technologies Company: *See*—
Stout, Mike F.; and Brunken, Dean, 4,931,319, Cl. 427-421.000.

Advanced Micro Devices, Inc.: *See*—
Agrawal, Om, 4,931,671, Cl. 307-465.000.
Brown, Candice H.; and Fatemi, Homi, 4,931,852, Cl. 357-72.000.
Chow, David G. L.; and Liu, Jack M. S., 4,932,001, Cl. 365-233.500.
Naghshineh, Kianoosh, 4,931,673, Cl. 307-475.000.

Advanced Refinery Technology: *See*—
Wilwerding, Carl M., 4,931,167, Cl. 208-262.500.

Agab, David: *See*—
Fuchs, Hugo; Agab, David; Neubauer, Gerald; and Ritz, Josef, 4,931,592, Cl. 564-267.000.

Agrawal, Om, to Advanced Micro Devices, Inc. Multiple array customizable logic device. 4,931,671, Cl. 307-465.000.

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Ryham, Rolf, 4,930,429, Cl. 110-229.000.

Ahmed, Fahim U.; Buck, Charles E.; Camara, Michael A.; Cush, James F., Jr.; and Kaeser, James A., to Colgate-Palmolive Company. Automatic dishwashing detergent powder by spraying drying and post-adding nonionic detergent. 4,931,203, Cl. 252-99.000.

Ahrens, Norbert; Kluger, Wolfgang; Mihatsch, Joachim-Rudolf; and Rzadki, Hans-Jurgen, to Krupp Polysius AG. Silo for storing and discharging bulk material and method of operating such silo. 4,930,943, Cl. 406-90.000.

Aida, Kuniko: *See*—
Yata, Akio; and Aida, Kuniko, 4,930,902, Cl. 374-150.000.

Aidlin Automation Corp.: *See*—
Aidlin, Stephen H.; Reed, Bradley E.; and Strassner, John B., 4,930,327, Cl. 72-148.000.

Aidlin, Stephen H.; Reed, Bradley E.; and Strassner, John B., to Aidlin Automation Corp. Battery core wrapping method and apparatus. 4,930,327, Cl. 72-148.000.

Aihara, Yasuyuki; Baba, Shigeki; Akiyama, Eietsu; and Sawada, Tatsumi, to Honda Giken Kogyo Kabushiki Kaisha. Engine room-cooling control system. 4,930,460, Cl. 723-41.490.

Air Preheater Company, Inc., The: *See*—
Harder, William F., 4,930,569, Cl. 165-10.000.

Air Products and Chemicals, Inc.: *See*—
Bafford, Richard A.; Faircloth, George E.; and Lee, Hseuh C., 4,931,495, Cl. 524-460.000.
Burgoyne, William F., Jr.; Langsam, Michael; Ford, Michael E.; and Casey, Jeremiah P., 4,931,182, Cl. 210-500.390.
Lai, Ta-Wang; Pinschmidt, Robert K., Jr.; and Burgoyne, William F., Jr., 4,931,501, Cl. 525-61.000.

Air-Zermatt AG.: *See*—
Perren, Beat H.; and Rossi, Albino, 4,930,826, Cl. 294-68.270.

Aisin Seiki Kabushiki Kaisha: *See*—
Kakinami, Toshiaki; and Hamajima, Shigemitsu, 4,931,937, Cl. 364-424.010.
Kanai, Naritoshi; and Suzuki, Akira, 4,931,036, Cl. 600-18.000.
Kawata, Shoji; Miyake, Osamu; Suzumura, Nobuyasu; and Takeuchi, Motohide, 4,931,939, Cl. 364-426.040.
Nakamura, Mamoru, 4,930,747, Cl. 251-129.170.

Akabane, Hidemitsu; Isobe, Toshimi; and Hoshino, Seiichi, to Sanden Corporation. Damper motor control circuit for an automotive air conditioning system. 4,930,567, Cl. 165-25.000.

Akabane, Yasuhiro; Temura, Takamitsu; and Fujiwara, Masami, to Lion Corporation; and Sankyo Company Limited. Piperidines. 4,931,562, Cl. 546-19.000.

Akada, Yasuaki: *See*—
Hamada, Masataka; Ishida, Tokuji; and Akada, Yasuaki, 4,931,821, Cl. 354-402.000.

Akahori, Hiroyuki: *See*—
Asano, Makoto; Tsutsumi, Haruki; Tanaka, Eishi; Fuseya, Yoshiro; Hasegawa, Kiyoharu; and Akahori, Hiroyuki, 4,931,420, Cl. 503-205.000.

Akai, Setsukazu; and Sawayama, Minoru, to Mitsubishi Jidosha Kogyo Kabushiki Kaisha. Mounting structure for one-way clutch in automatic transmission. 4,930,610, Cl. 192-7.000.

Akebomo Brake Industry Co.: *See*—
Miyake, Katsuya; and Hirobe, Yoshiaki, 4,930,846, Cl. 303-111.000.

Akebono Brake Industry Co., Ltd.: *See*—
Itoh, Susumu; Satoh, Kazuo; and Sakuma, Tomonori, 4,930,260, Cl. 51-103.0TF.

Akiba, Shigeyuki: *See*—
Usami, Masashi; Akiba, Shigeyuki; and Matsushima, Yuichi, 4,932,034, Cl. 372-96.000.

Akiba, Yutaka: *See*—
Kasukabe, Susumu; Ookubo, Masasi; Akiba, Yutaka; Tanaka, Minoru; and Yokono, Hitoshi, 4,931,726, Cl. 324-158.00F.

Akimoto, Keiichi: *See*—
Matsuoka, Masahiro; Akimoto, Keiichi; Sumita, Takeshi; Tomosada, Tsuyoshi; and Ishikawa, Isao, 4,931,483, Cl. 521-137.000.

Akimoto, Kunio; Ikeuchi, Satoru; and Takizawa, Yoshio, to Konishiroku Photo Industry Co., Ltd. Powdered electrostatic image developing toner. 4,931,375, Cl. 430-109.000.

Akisue, Osamu: *See*—
Yamada, Teruaki; Ukena, Toshiyasu; Akisue, Osamu; Kawai, Kenji; Sano, Yuuji; and Hayashida, Teruki, 4,931,107, Cl. 148-12.300.

Akita, Shigeyuki: *See*—
Yamanoue, Kouichi; Akita, Shigeyuki; Tanaka, Hiroaki; Sugitani, Tatsuo; and Inoue, Hideo, 4,931,727, Cl. 324-172.000.

Akita, Yoshisuke: *See*—
Takeuchi, Kunihiko; Akita, Yoshisuke; and Hayakawa, Osamu, 4,930,992, Cl. 417-20.000.

Akiyama, Eitetsu: *See*—
Aihara, Yasuyuki; Baba, Shigeki; Akiyama, Eitetsu; and Sawada, Tatsumi, 4,930,460, Cl. 723-41.490.

Aktiebolaget Electrolux: *See*—
Gerhardsson, Sven L., 4,930,818, Cl. 292-29.000.

AKZO NV: *See*—
Beck, Heinz; Frassek, Karl-Heinz; Verhulst, Eduard M.; and Giezen, Egenius A., 4,931,197, Cl. 252-56.00R.

Aladdin Industries Inc.: *See*—
Bridges, John A., 4,930,628, Cl. 206-45.230.

Albany International Corp.: *See*—
Barnewall, James M., 4,931,010, Cl. 428-282.000.

Albares, Donald J.; Cavanaugh, David B.; and Trask, Thomas W., to United States of America, Navy. Optical fiber-to-channel waveguide coupler. 4,930,854, Cl. 350-96.170.

Albisetti, Charles J.; and Castle, John E., to University of Delaware. Dispersions of chitin and product therefrom. 4,931,551, Cl. 536-20.000.

Albrecht, Hans; Reiniger, Siegfried; Lauer, Wolfgang; Spies, Hans; Laucht, Horst; and Spies, Martin, to Daimler-Benz AG. Device for visibility measurement for a motor vehicle. 4,931,767, Cl. 340-425.500.

Alcan International Limited: *See*—
Ritter, John A.; Tomaka, Jan Z.; and Muda, Jozes A., 4,930,427, Cl. 105-406.100.
Waite, Peter D.; and Dube, Ghyslain, 4,931,091, Cl. 75-680.000.

Aldava, Michael B.: *See*—
MacIntyre, Hazen L.; Graham, Richard D., II; and Aldava, Michael B., 4,931,738, Cl. 324-435.000.

Aldinger, Fritz: *See*—
Gerdau, Thomas; Kleiner, Hans-Jerg; Peuckert, Marcellus; Bruck, Martin; and Aldinger, Fritz, 4,931,513, Cl. 525-474.000.

Alexander, Malcolm H. No-till field implement. 4,930,431, Cl. 111-164.000.

Alexandrou, Alex P.: *See*—
Diamantopoulos, Costas A.; and Alexandrou, Alex P., 4,930,504, Cl. 128-395.000.

Alfa-Laval Separation AB: *See*—
Stroucken, Klaus, 4,930,412, Cl. 494-70.000.

Alfano, Michele A.: *See*—
Alfano, Robert R.; and Alfano, Michele A., 4,930,516, Cl. 128-665.000.

Alfano, Robert R.; and Alfano, Michele A. Method for detecting cancerous tissue using visible native luminescence. 4,930,516, Cl. 128-665.000.

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Bleckmann, Hans W.; Fennel, Helmut; Graeber, Johannes; Determann, Otto; and Batistic, Ivica, 4,930,845, Cl. 303-100.000.
Budecker, Ludwig, 4,930,994, Cl. 417-286.000.

Algotek, Inc.: *See*—
Liverani, Maurizio, 4,930,520, Cl. 128-746.000.

Allan, Alexander, to Gas Application Products (GAP) Inc. Gas log apparatus. 4,930,490, Cl. 126-92.00R.

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Salsgiver, James A.; Bartel, Eugene W.; and Rudolf, Rowland C., III, 4,931,613, Cl. 219-68.000.

Allen, Dillis V. Constant resonant frequency golf club head. 4,930,781, Cl. 273-167.00F.

Allen, James H., to 'totes' Incorporated. Umbrella with retractable carrying strap. 4,930,533, Cl. 135-20.00R.

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Allenson, Stephen J.: *See*—
Braden, Michael L.; and Allenson, Stephen J., 4,931,191, Cl. 210-725.000.

Alley, Kenneth A. Sanitary cover for a liquid dispenser. 4,930,554, Cl. 141-97.000.

Alliance Automations Systems, Inc.: *See*—
Spacher, Paul F.; and Vadas, David J., 4,930,976, Cl. 414-744.800.

Allied-Signal Inc.: *See*—
Gualtieri, Devlin M.; and Chai, Bruce H. T., 4,931,133, Cl. 156-621.000.
Li, Hsin L.; and Oswald, Hendrikus J., 4,930,198, Cl. 28-257.000.
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Bannai, Hiroyuki, 4,930,716, Cl. 242-85.000.
Kano, Mitsuru; Miyagawa, Kenji; Yamaguchi, Masahiko; and Imaizumi, Eiji, 4,930,877, Cl. 350-339.00F.

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Macy, David F.; and Alsenz, Evert C., 4,930,351, Cl. 73-505.000.

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Haws, Spencer K., 4,930,551, Cl. 137-337.000.

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Lemarchand, Jean-Louis, 4,931,212, Cl. 252-502.000.

Alvyn, Alvin E. Moldable edge connecting apparatus. 4,930,753, Cl. 256-26.000.

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Edgren, David E.; and Theeuwes, Felix, 4,931,285, Cl. 424-473.000.

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Baiocchi, Antonella; and Alzati, Angelo, 4,931,676, Cl. 307-571.000.

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Amano, Hironobu: *See*—
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Amberger, Franz: *See*—
Bois, Wilhelm; Amberger, Franz; and Buchl, Josef, 4,930,609, Cl. 192-4.00A.

Amest, Myron J., to Household Manufacturing, Inc. Toilet with vortex flushing action. 4,930,167, Cl. 4-420.000.

American Colloid Company: *See*—
Teppo, Maynard, 4,931,231, Cl. 264-13.000.

American Cyanamid Company: *See*—
Martin, Craig A., 4,931,089, Cl. 71-121.000.

American Home Products Corp. (Del): *See*—
Tsuk, Andrew G., 4,931,283, Cl. 424-449.000.

American National Can Company: *See*—
Kudert, Frederick G.; Latreille, Maurice G.; McHenry, Robert J.; Nahill, George F.; Pfutzenreuter, Henry, III; Tennant, William A.; Tung, Thomas T.; and Vella, John, Jr., 4,931,246, Cl. 264-241.000.

American Telephone and Telegraph Company: *See*—
Ting, Tah-Kang J., 4,931,670, Cl. 307-448.000.

Amoco Corporation: *See*—
Dickinson, Barry L., 4,931,364, Cl. 428-412.000.
Peelman, Paul L.; and Malosh, Edward A., 4,931,237, Cl. 264-48.000.
Qureshi, Shahid P.; Gardner, Hugh C.; and Newman-Evans, Richard H., 4,931,496, Cl. 524-612.000.

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AMP Incorporated: *See*—
Cvijanovich, George B., 4,931,991, Cl. 365-52.000.
Haddock, John T.; Miller, Charles A.; Moist, Stanford C., Jr.; Nauman, Warren D.; and Pala, Ronald S., 4,930,209, Cl. 29-592.100.

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Chiquet, Andre , 4,931,488, Cl. 523-126.000.

AMSTED Industries, Incorporated: *See*—
Springman, Charles G., 4,930,620, Cl. 198-803.010.

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Anderka, Gerold, to Koh-I-Noor Rapidograph, Inc. Tubular writting pen with superposed pressure equalization chambers. 4,930,921, Cl. 401-258.000.

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Anderson, Dale R., to Motorola, Inc. Wide bandwidth frequency doubler. 4,931,921, Cl. 363-163.000.

Anderson, Eric W.: *See*—
Ford, Douglas L.; Anderson, Eric W.; and Kopp, Clinton V., 4,931,186, Cl. 210-636.000.

Anderson, Erik V.: *See*—
Russel, Steven M.; McGlen, James A.; and Anderson, Erik V., 4,930,765, Cl. 271-214.000.

Anderson, Paul G.; and McMennamy, John A., to Movats Incorporated. Stem load determining system. 4,930,228, Cl. 33-788.000.

Anderson, Theodore: *See*—
Cotter, Terrence; Anderson, Theodore; Gansser, Robert; Kryk, Lewis R.; and Rieple, Theodore R., 4,931,202, Cl. 252-99.000.

Ando, Ryo: *See*—
Yoshida, Tadao; Fujiie, Kazuhiko; and Ando, Ryo, 4,932,016, Cl. 369-48.000.

Ando, Shigeru, to Fuji Photo Film Co., Ltd. Magnetic disc plack loading mechanism with shutter opening and closing mechanism. 4,931,891, Cl. 360-99.060.

Ando, Susumu; and Hagiwara, Ikuo, to Nippon Chemi-Con Corporation. Chip type capacitor and manufacture thereof. 4,931,961, Cl. 361-535.000.

Ando, Takaharu, to Emu-Esu Industrial Co., Ltd. Keyless chuck. 4,930,793, Cl. 279-61.000.

Ando, Tatsuo: *See*—
Hosoi, Hisataka; Endo, Hozumi; Ando, Tatsuo; and Shoji, Mamoru, 4,931,239, Cl. 264-63.000.

Ando, Wataru: *See*—
Matsumoto, Masakazu; Ishikawa, Shozo; Ando, Wataru; Kikuchi, Toshihiro; and Yamazaki, Itaru, 4,931,371, Cl. 430-59.000.

Andrews, Peter: *See*—
Jensen-Korte, Uta; Schallner, Otto; Stetter, Jorg; Becker, Benedikt; Behrenz, Wolfgang; Stendel, Wilhelm; and Andrews, Peter, 4,931,461, Cl. 514-404.000.

Andrulis, Peter J., Jr.: *See*—
Gill, Devinder S.; and Andrulis, Peter J., Jr., 4,931,553, Cl. 536-121.000.

Angeloz, Corinne; Huerlimann, Peter; and Van Meir, Eugene, to Nestec S.A. Container and teat feeding assembly. 4,930,690, Cl. 222-490.000.

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Anro Engineering, Inc.: *See*—
Kahn, Walter K., 4,931,771, Cl. 340-556.000.

Anschel, Morris; and Pawlowski, Walter P., to International Business Machines Corporation. Process for treating the surface of polyimides to improve properties to receive metal layer. 4,931,310, Cl. 427-55.000.

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Heichler, Johannes, 4,932,029, Cl. 371-43.000.

Antenna Company, The: *See*—
Fisher, Roger K., 4,931,805, Cl. 343-715.000.
Wunderlich, Blake A., 4,931,806, Cl. 343-715.000.

Antonious, Anthony J. Golf club. 4,930,783, Cl. 273-164.000.

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Aoki, Yoshitaka, to NEC Corporation. Skew compensation circuit effectively operated during readout in a reverse sense. 4,931,884, Cl. 360-26.000.

Aoyama, Michishige, to Kabushiki Kaisha Kaisha Toshiba. Dough stuff kneader. 4,930,899, Cl. 366-98.000.

Apco Power-Unit Corporation: *See*—
Eichenberger, William A., 4,930,182, Cl. 16-198.000.

Appel, Marvin L.: *See*—
Cohen, Richard J.; Appel, Marvin L.; and Berger, Ronald D., 4,930,517, Cl. 128-671.000.

Apple Computer, Inc.: *See*—
Atkinson, William D., 4,931,783, Cl. 340-710.000.
Fitch, Jonathan; and Hochsprung, Ronald, 4,931,923, Cl. 364-200.000.

Applied Extrusion Technologies, Inc.: *See*—
Hovis, Edward E.; Johnson, Eric D.; and Schroeder, Michael J., 4,931,484, Cl. 521-143.000.

Applied Magnetic Lab Co., Ltd.: *See*—
Kuromatsu, Akio, 4,930,486, Cl. 125-11.010.

Applied Vascular Devices, Inc.: *See*—
Cooper, Robert P., 4,931,058, Cl. 606-158.000.

Aqualon Company: *See*—
Johnson, Joseph L.; and Skinner, George W., 4,931,286, Cl. 424-480.000.

Arai, Hiroyuki: *See*—
Nagasawa, Naobumi; Houshi, Teruo; and Arai, Hiroyuki, 4,932,018, Cl. 369-59.000.

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Horiuchi, Takao; Arai, Izumi; and Tahara, Yoshifumi, 4,931,135, Cl. 156-643.000.

Arai, Noboru: *See*—
Miyagawa, Ichiro; and Arai, Noboru, 4,930,869, Cl. 350-6.800.

Arai, Takayoshi: *See*—
Iida, Shigehira; Arai, Takayoshi; Hashizume, Junichiro; Takei, Tetsuya; and Saitoh, Keishi, 4,930,442, Cl. 118-723.000.

Arai, Tatsuo; Saito, Takayoshi; Tsujimura, Osamu; and Hayashizaki, Hiroaki, to Mitsubishi Metal Corporation. Insert rotary cutter. 4,930,945, Cl. 407-40.000.

Arakawa, Nobuyuki; Suzuki, Hirotsugu; and Nishihara, Tokihiro, to Sony Corporation. Method of forming a protective film for an optical recording medium. 4,931,313, Cl. 427-164.000.

Arakawa, Satoshi: *See*—
Hosoi, Yuichi; Takahashi, Kenji; and Arakawa, Satoshi, 4,931,642, Cl. 250-327.200.

Araki, Nobuhiro: *See*—
Takata, Naoto; Kanai, Seita; Araki, Nobuhiro; and Udo, Tadashi, 4,930,805, Cl. 280-690.000.

Arase, Takuya; Tokunaga, Katsushi; and Daimon, Shigeo, to Daikin Industries Ltd. Magnetic particles composed mainly of FeC and a process for preparing same. 4,931,198, Cl. 252-62.510.

Arco Chemical Technology, Inc.: *See*—
McCready, Russell J., 4,931,502, Cl. 525-64.000.

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Layton, Derek G.; Smith, Alan M.; Fisher, John H.; Pettigrew, Robert M.; and Petty-Saphon, Satham, 4,931,384, Cl. 435-7.000.

Argy, Gilles: *See*—
Busnel, Rene-Guy; and Argy, Gilles, 4,930,522, Cl. 128-844.000.

Aristech Chemical Corporation: *See*—
Cullo, Leonard A.; Nagle, Elliott V., Jr.; Restelli, Edward F., Jr.; and Yogan, Thomas J., 4,931,418, Cl. 502-218.000.

Arlt, Dieter: *See*—
Schwartz, Ulrich; Grosser, Rolf; Piejko, Karl-Erwin; Bomer, Bruno; and Arlt, Dieter, 4,931,525, Cl. 526-305.000.

Armeniades, C. D. Expandable polymer concretes and mortars utilizing low cure temperature polymers. 4,931,490, Cl. 523-218.000.

Arndt, Alfred; and Rutty, John G. Aircraft voice communication anti-blocking device. 4,932,071, Cl. 455-58.000.

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Castonguay, Roger N.; Klein, Keith W.; Arnold, David; and Ellis, Preston L., 4,931,603, Cl. 200-144.00R.

Arona-Delonghi, Adriano G., to Fabricacion de Maquinas, S.A. Cap for bottles and the like. 4,930,688, Cl. 222-484.000.

Aronoff, Marvin S.: *See*—
Keyes, Denis E.; and Aronoff, Marvin S., 4,930,942, Cl. 406-49.000.

Artwave America Inc.: *See*—
Jaffa, David, 4,930,413, Cl. 101-126.000.

Arvin Industries, Inc.: *See*—
Udell, Randal R., 4,930,597, Cl. 181-256.000.

Asada, Toshiyuki: *See*—
Nakawaki, Yasunori; Ushijima, Fumihiro; Numazawa, Akio; and Asada, Toshiyuki, 4,930,373, Cl. 475-128.000.

Asahi/America, Inc.: *See*—
Zia, Christopher G., 4,930,544, Cl. 138-113.000.

Asahi Glass Company Ltd.: *See*—
Miyazaki, Nobuyuki; Unoki, Masao; and Munekata, Seiji, 4,931,505, Cl. 525-125.000.

Asahi Kasei Kogyo Kabushiki Kaisha: *See*—
Fukawa, Isaburo; and Tanabe, Tsuneaki, 4,931,530, Cl. 528-125.000.
Ikematsu, Takeshi; Hattori, Yasuo; Inoki, Yoshihiro; and Tanaka, Mitsuhiro, 4,931,376, Cl. 526-164.000.
Yamaguchi, Junji; and Yamasaki, Terumasa, 4,931,760, Cl. 335-306.000.

Asahi Kogaku Kogyo Kabushiki Kaisha: *See*—
Morimoto, Akira, 4,930,850, Cl. 350-6.800.

Asano, Makoto; Tsutsumi, Haruki; Tanaka, Eishi; Fuseya, Yoshiro; Hasegawa, Kiyoharu; and Akahori, Hiroyuki, to Mitsui Toatsu Chemicals, Inc. Temperature history indicator and its manufacturing method. 4,931,420, Cl. 503-205.000.

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ASC Incorporated: *See*—
Cichoski, Richard; and Kilpinen, Michael, 4,930,833, Cl. 296-136.000.

Ascii Corporation: *See*—
Ishii, Takatoshi, 4,931,785, Cl. 340-703.000.

Asea Brown Boveri Ltd.: *See*—
Garbe, Heyno; and Hansen, Diethard, 4,931,720, Cl. 324-627.000.

Asghar, Safdar M.; Pyi, Hwa-Sheng; and Dunnion, Dermot. Method of generating updated transversal filter coefficients. 4,931,973, Cl. 364-724.160.

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Peterson, Charles D.; Tutt, James R.; and Cody, John, 4,930,965, Cl. 414-149.000.

Ashley, Joseph L.; and Matthews, John D., to United States of America, Navy. Advanced heat pump. 4,930,322, Cl. 62-271.000.

Asmus, Robert A.; and Duan, Daniel C., to Minnesota Mining and Manufacturing Company. Pressure-sensitive medical sealant. 4,931,282, Cl. 424-448.000.

Aspnes, David E.; Bhat, Rajaram; Colas, Etienne G.; Florez, Leigh T.; Harbison, James P.; and Studna, Amabrose A., to Bell Communications Research, Inc. Optical control of deposition of crystal monolayers. 4,931,132, Cl. 156-601.000.

Assal, Francois T.; Evans, John V.; Mahle, Christoph E.; Zaghloul, Amir I.; and Gupta, Ramesh K., to Communications Satellite Corporation. Multiple spot-beam systems for satellite communications. 4,931,802, Cl. 342-356.000.

Assar, Mahmud M.: *See*—
Ravindra, H.; Patil, Suhas S.; Lin, Ernest S.; Assar, Mahmud M.; and Reddy, Dayakar, 4,931,946, Cl. 364-490.000.

Assinck, Leonardus W.: *See*—
Geverink, Hendrikus J.; and Assinck, Leonardus W., 4,930,624, Cl. 198-835.000.

Assing-Collier, Amoy M. Process for preparing salted-and-dried fish for eating. 4,931,299, Cl. 426-325.000.

Astley, Graham, to Belanger, Inc. Conveyor chain guide. 4,930,424, Cl. 104-172.300.

Astley, Graham J.: *See*—
Belanger, James A.; Wentworth, Robert J.; Turner, Barry S.; and Astley, Graham J., 4,931,244, Cl. 264-154.000.

AT&T Bell Laboratories: *See*—
Acarlar, Muvaffak S., 4,930,857, Cl. 350-96.200.
Baral, Elliott; Brown, Percy B.; Hauptman, Reuben D.; Jaeger, Richard J., Jr.; LaPorta, Frank C.; Lauber, Pamela J.; LeCronier, Richard E.; Nelson, Randall H.; Russell, Thomas L., Jr.; and Ying, Wen-Ping, 4,932,042, Cl. 379-67.000.
Brenner, Karl-Heinz; Huang, Alan; and Lohmann, Adolf W., 4,931,959, Cl. 364-525.000.
Chung, Yun C., 4,932,030, Cl. 372-32.000.
Davidson, Wayne A.; and Larson, Daniel H., 4,932,050, Cl. 379-211.000.

Koch, Thomas L.; and Koren, Uziel, 4,932,032, Cl. 372-45.000.
Moody, Taryn S., 4,932,021, Cl. 370-54.000.
Pashan, Mark A.; and Vaidya, Avinash K., 4,932,020, Cl. 370-14.000.
Atkins, Don C.: *See*—
Eckert, Robert L.; Atkins, Don C.; and Sechler, Lee, 4,930,632, Cl. 206-386.000.
Atkinson, William C.; and Fields, Roger A., to Eastman Kodak Company. Film cassette and method of assembling the same. 4,931,819, Cl. 354-275.000.
Atkinson, William D., to Apple Computer, Inc. Method and apparatus for removable menu window. 4,931,783, Cl. 340-710.000.
Atlantis Transportation Services Inc.: *See*—
Thorndyke, Robert J., 4,930,612, Cl. 193-35.0SS.
Atochem North America: *See*—
McKown, Clem S., 4,930,700, Cl. 239-102.200.
Attalla, Giancarlo: *See*—
Corradini, Paolo; De Rosa, Claudio; Guerra, Gaetano; Nicolais, Luigi; Petraccone, Vittorio; and Attalla, Giancarlo, 4,931,325, Cl. 428-35.700.
Atwater, Charles B., to Du Pont de Nemours, E. I., and Company. Tricholine phosphate surface treating agent. 4,931,103, Cl. 134-2.000.
Auchter, Gerhard; Schwerzel, Thomas; Osterloh, Rolf; Neubert, Gerhard; Pfoehler, Peter; Druschke, Wolfgang; and Jaeger, Helmut, to BASF Aktiengesellschaft. Aqueous polymer dispersions having a long shelf life. 4,931,494, Cl. 524-460.000.
Audi AG: *See*—
Bois, Wilhelm; Amberger, Franz; and Buchl, Josef, 4,930,609, Cl. 192-4.00A.
Aue, Alfred A., to Wittman GmbH. Device for the injection of posts into ear lobes. 4,931,060, Cl. 606-188.000.
Austin, John A.: *See*—
Zlotnik, Arnold; Zlotnik, Milton; and Austin, John A., 4,931,258, Cl. 422-124.000.
Automobiles Citroen: *See*—
Lachaize, Henri, 4,930,807, Cl. 280-707.000.
Automobiles Peugeot: *See*—
Lachaize, Henri, 4,930,807, Cl. 280-707.000.
Automotive Systems Laboratory, Inc.: *See*—
Poole, Donald R.; and Wilson, Michael A., 4,931,111, Cl. 149-35.000.
Autronic Plastics, Inc.: *See*—
Lax, Michael, 4,930,735, Cl. 248-101.000.
Avco Corporation: *See*—
Naik, Subhash K.; and Fiedler, Louis J., 4,931,152, Cl. 204-38.500.
Ayer, David H.: *See*—
Willey, Clair L.; and Ayer, David H., 4,930,941, Cl. 406-10.000.
Ayers, Alan D.; and Wesner, John A., to Eveready Battery Company. Vent liner and cover construction for galvanic cells. 4,931,368, Cl. 429-53.000.
Ayres, James D.: *See*—
Cohen, Donald K.; Ayres, James D.; and Cochran, Eugene R., 4,931,630, Cl. 250-201.300.
B-Dry Systems: *See*—
Bevilacqua, Joseph, 4,930,272, Cl. 52-169.500.
B. F. Goodrich Company, The: *See*—
Sharaby, Zaev, 4,931,518, Cl. 526-211.000.
Yu, Simon H., 4,931,506, Cl. 525-187.000.
B&G Plastics, Inc.: *See*—
Smilow, George; and Kayen, Samuel L., 4,930,692, Cl. 223-85.000.
B & H Manufacturing Company, Inc.: *See*—
Mitchell, Monte C., 4,931,122, Cl. 156-215.000.
Baba, Masatoshi; Tanaka, Norio; and Suzuki, Hideo, to Nissan Chemical Industries, Ltd. Process for production of 2-pyrazolin-5-ones. 4,931,565, Cl. 548-363.000.
Baba, Shigeki: *See*—
Aihara, Yasuyuki; Baba, Shigeki; Akiyama, Eitetsu; and Sawada, Tatsumi, 4,930,460, Cl. 723-41.490.
Baba, Takeaki; Nanba, Keizo; Takeshima, Yoshio; Sano, Hiromichi; Tobita, Koji; Muneto, Atsuo; Hara, Toshihiro; and Fujise, Kazuki, to Sumitomo Light Metal Industries, Ltd. Honeycomb panel structure. 4,931,340, Cl. 428-73.000.
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Miers, David R.; Raj, David; and Varshneya, Deepak, 4,930,862, Cl. 350-96.290.
Bacciarelli, Carla: *See*—
Fedi, Mauro; Bacciarelli, Carla; and Bonacchi, Graziano, 4,931,437, Cl. 514-234.200.
Bachman, Wesley J., to Dickey-John Corporation. Liquid-vapor change of phase detector. 4,931,774, Cl. 340-603.000.
Backes, James J., to Square D Company. Aligning bracket for a circuit board in a circuit board housing. 4,931,909, Cl. 361-399.000.
Backx, Leo J. J.: *See*—
Van Wauwe, Jean P. F.; Heeres, Jan; and Backx, Leo J. J., 4,931,444, Cl. 514-252.000.
Bae, You H.; Okano, Teruo; and Kim, Sung W., to University of Utah. Heterogeneous interpenetrating polymer networks for the controlled release of drugs. 4,931,287, Cl. 424-484.000.
Bafford, Richard A.; Faircloth, George E.; and Lee, Hseuh C., to Air Products and Chemicals, Inc. Non-aqueous dispersion polymerization. 4,931,495, Cl. 524-460.000.
Bagalini, Dante, to Circuit Breaker Industries Limited. Electro-magnetic shunt trip device. 4,931,758, Cl. 335-174.000.
Baginski, Mark J., to Sperry Marine Inc. Shaft angle encoder interface. 4,931,792, Cl. 340-870.190.
Bague, Arlette: *See*—
Saint-Leger, Didier; and Bague, Arlette, 4,931,467, Cl. 514-529.000.
Bagwell, Timothy L.: *See*—
Bray, Robert C.; Johnsen, Catherine A.; Bagwell, Timothy L.; and Ishak, Waguih S., 4,931,752, Cl. 333-151.000.
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Block, Elliott; Bahar, Izak; Cole, Frank; Eaton, Cheryl A.; Jones, Wendy; Sigillo, Eric; Coseo, Mary; Cicia, Nancy J.; Cannon, L. Edward; and Cantarow, Walter, 4,931,385, Cl. 435-7.000.
Baiocchi, Antonella; and Alzati, Angelo, to SGS-Thomson Microelectronics S.R.L. Low-absorption circuit device for controlling a power transistor into the on state. 4,931,676, Cl. 307-571.000.
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Baker, Carl H., 4,930,193, Cl. 24-129.00R.
Baker, Carl H., to Baker Cable Ltd. Cable retaining apparatus. 4,930,193, Cl. 24-129.00R.
Baker, Don R.; Walker, Francis H.; and Brownell, Keith H., to ICI Americas Inc. Fungicidal pyridyl sulfenyl carbamates. 4,931,451, Cl. 514-335.000.
Baker, Knapp & Tubbs, Inc.: *See*—
Woller, Thomas A., 4,930,173, Cl. 5-481.000.
Baker, Norman A. Eccentrically loaded computerized positive/negative exercise machine. 4,930,770, Cl. 272-129.000.
Baker, Russ J.; and Hansen, Robert A., to Emhart Industries, Inc. Glass container inspecting machine. 4,930,364, Cl. 73-865.800.
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Bandhopadhyay, Deb K.; Greenlees, Thomas A.; and Rubbelke, David L., 4,930,348, Cl. 73-472.000.
Balazs Analytical Laboratory: *See*—
Tan, Samantha S. H., 4,930,360, Cl. 73-864.340.
Baldeschwieler, John D.; and Goodrich, Raymond P., Jr., to California Institute of Technology. Cryoprotective reagents in freeze-drying membranes. 4,931,361, Cl. 428-402.200.
Baldwin-Japan Limited: *See*—
Hara, Akira; and MacPhee, John, 4,930,415, Cl. 101-228.000.
Baldwin, Judith A. M.; and Selwyn, Stephen, to Strategic Financial Communications Corp. Loose-leaf notebook construction. 4,930,925, Cl. 402-30.000.
Baldwin, Kenneth G., Jr.: *See*—
Marsh, Colleen E.; and Baldwin, Kenneth G., Jr., 4,930,837, Cl. 296-165.000.
Baldwin, Richard R., to Hewlett-Packard Company. Minimum dead-path interferometer and dilatometer. 4,930,894, Cl. 356-351.000.
Balint, Sandor: *See*—
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Lalezari, Farzin; Munson, Michael G.; and Cronin, Theresa A., 4,931,808, Cl. 343-753.000.
Ballu, Patrick J., to Tecnoma. Device for cleaning the inside of a container with a jet of liquid. 4,930,531, Cl. 134-167.00R.
Bambacigno, Ralph: *See*—
Lindquist, Thomas A.; and Bambacigno, Ralph, 4,931,235, Cl. 264-40.100.
Ban, Yutaka; and Nagashima, Toshiaki, to Canon Kabushiki Kaisha. Developing apparatus and process cartridge having the same. 4,931,838, Cl. 355-260.000.
Band, Elliot I., to Rhone-Poulenc Basic Chemicals Co. Process for preparing activators for fast-setting cements. 4,931,097, Cl. 106-672.000.
Bandhopadhyay, Deb K.; Greenlees, Thomas A.; and Rubbelke, David L., to Balance Engineering Corporation. Vertical balancing machine with cartridge assembly. 4,930,348, Cl. 73-472.000.
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Barabino, William A.; and Cross, Robert J., to Physiological Research Associates. Composition for the effective treatment of scalp diseases that delivers magnesium adsorbed in alumina silicate clays to affected sites. 4,931,274, Cl. 424-70.000.
Barak, Jacob H., to Abiomed, Inc. Surgical stapler. 4,930,674, Cl. 227-179.000.
Baral, Elliott; Brown, Percy B.; Hauptman, Reuben D.; Jaeger, Richard J., Jr.; LaPorta, Frank C.; Lauber, Pamela J.; LeCronier, Richard E.; Nelson, Randall H.; Russell, Thomas L., Jr.; and Ying, Wen-Ping, to AT&T Bell Laboratories. Spontaneous voice and data messaging. 4,932,042, Cl. 379-67.000.
Baran, John S.: *See*—
Hanson, Gunnar J.; and Baran, John S., 4,931,429, Cl. 514-19.000.
Barbier, Pierre; Schneider, Fernand; and Widmer, Ulrich, to Hoffmann-La Roche Inc. Oxetanones. 4,931,463, Cl. 514-422.000.
Barfurth, Dieter; Lindzus, Claus; and Nestler, Heinz, to Huels Troisdorf AG. Titanium(IV)-chelates and their use in printing inks. 4,931,094, Cl. 106-20.000.
Barker, Mark P., to NCR Corporation. Circuit and method for regulating output voltage of a switch mode power supply having a current mode magnetic amplifier. 4,931,920, Cl. 363-82.000.
Barker, Michael J., to Omnitech (Europe) Limited. Carton packaging systems and processes. 4,930,290, Cl. 53-456.000.

Barlai, Zoltan; Dorcsi, Geza; Rez, Ferenc; and Vamos, Attila, to Magyar Allami Eotvos Lorand Geofizikai Intezet; and Koolajkutato Vallat, a part interest. Method of and apparatus for microelectric measuring of inhomogeneities on the walls of boreholes for use in well logging. 4,931,736, Cl. 324-367.000.

Barlow, George J., to Bull HN Information Systems Inc. Bidirectional control signalling bus interface apparatus for transmitting signals between two bus systems. 4,932,040, Cl. 375-111.000.

Barnard, Michael A.; and Beugelsdyk, Anthony F., to Wescon Products Company. Radial ground drive and blade clutch control for lawnmower. 4,930,369, Cl. 74-480.00R.

Barnett, Charles B.; and Rabinovich, Leonid, to Figgie International, Inc. Automatic sprinkler. 4,930,578, Cl. 169-39.000.

Barnett, Charles J., to Eli Lilly and Company. Processes for preparing intermediates of picenadol. 4,931,558, Cl. 544-124.000.

Barnett, Daniel B.: *See*—
Goff, Larry; King, Lawrence A.; Barnett, Daniel B.; and Justice, Samuel P., 4,931,745, Cl. 330-9.000.

Barnewall, James M., to Albany International Corp. Fabrics having hydrophilic and hydrophobic foams. 4,931,010, Cl. 428-282.000.

Barnhart, James E.: *See*—
Daniel, Richard A.; Rowson, Stuart C.; Barnhart, James E.; and Paek, Woonsuk, 4,931,986, Cl. 364-900.000.

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Plee, Steven L.; Hartman, Peter; Martin, Jay K.; Nolan, J. Paul; Remboski, Donald J., Jr.; and Ross, Richard R., 4,930,478, Cl. 123-425.000.

Barrett, Kevin F.: *See*—
Courtright, Steven B.; and Barrett, Kevin F., 4,931,295, Cl. 426-5.000.

Barrs, John W.: *See*—
Rhodes, Joseph C., Jr.; Moore, Victor S.; Kraft, Wayne R.; and Barrs, John W., 4,931,989, Cl. 364-900.000.

Barsley, Paul N.: *See*—
Sampson, Craig F.; Sun, Rickson; Barsley, Paul N.; and Boyle, Dennis J., 4,930,911, Cl. 400-28.000.

Bart, Joseph; and Wollar, Burnell J., to Phillips Plastics Corporation. Means for filling, sealing and concealing an elongated groove. 4,930,279, Cl. 52-466.000.

Bartel, Eugene W.: *See*—
Salsgiver, James A.; Bartel, Eugene W.; and Rudolf, Rowland C., III, 4,931,613, Cl. 219-68.000.

Bartel, Gunter: *See*—
Tattermusch, Peter; and Bartel, Gunter, 4,930,804, Cl. 280-690.000.

Barthelmes, Patrice: *See*—
Lermuzeaux, Andre; and Barthelmes, Patrice, 4,931,232, Cl. 264-28.000.

Bartholmae, Jack N.: *See*—
Tompkins, E. Neal; Bartholmae, Jack N.; Zuber, Peter A.; and Charles, Kirk W., 4,931,839, Cl. 355-277.000.

Bartl, Knut: *See*—
Rehner, Helmut; Bartl, Knut; Stegmuller, Peter; Tischer, Wilhelm; and Rollinger, Sibylle, 4,931,392, Cl. 435-188.000.

Bartlett, Ian G.; and Lymer, Donald A., to Tybar Engineering Pty., Ltd. Carpets. 4,931,129, Cl. 156-435.000.

Basaly, Mores A.: *See*—
Srinivasan, Kollengode V.; Herrington, Leo P.; Basaly, Mores A.; and Poulsen, Harold W., 4,931,151, Cl. 204-376.000.

BASF Aktiengesellschaft: *See*—
Auchter, Gerhard; Schwerzel, Thomas; Osterloh, Rolf; Neubert, Gerhard; Pfoehler, Peter; Druschke, Wolfgang; and Jaeger, Helmut, 4,931,494, Cl. 524-460.000.
Baumgarte, Ulrich; Fikentscher, Rolf; Heimann, Sigismund; Mertens, Heinrich; Schneider, Siegfried; and Vescia, Michele, 4,931,065, Cl. 8-188.000.
Bay, Herbert; Eckert, Guenter; and Bergold, Wolfram, 4,931,062, Cl. 8-94.230.
Becker, Rainer; Eckhardt, Heinz; Eggersdorfer, Manfred; Schindler, Gerhard; and Jansen, Klaas, 4,931,428, Cl. 512-25.000.
Fuchs, Hugo; Agab, David; Neubauer, Gerald; and Ritz, Josef, 4,931,592, Cl. 564-267.000.
Hoelderich, Wolfgang; and Goetz, Norbert, 4,931,564, Cl. 546-286.000.
Kersten, Siegfried; Jaeger, Karl-Friedrich; Koenig, Karl-Heinz; Mueller, Albrecht; Pawliczek, Josef B.; Recker, Hans-Gert; Rohr, Wolfgang; and Wigger, August, 4,931,466, Cl. 514-490.000.
Kummer, Rudolf; Merger, Franz; Bertleff, Werner; and Fischer, Rolf, 4,931,590, Cl. 562-590.000.
Wahl, Ludwig; and Vogel, Helmut, 4,931,358, Cl. 428-285.000.

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Kucera, Clare H.; Crema, Stefano C.; Roznowski, Michael D.; Konrad, Gerd; and Hartmann, Heinrich, 4,931,489, Cl. 523-130.000.

BASF K & F Corporation: *See*—
Wood, Thomas G.; and Xenides, Carol J., 4,931,280, Cl. 424-439.000.

Basile, Peter A., to Kroy Inc. Thermal printing device and tape supply cartridge therefor. 4,930,913, Cl. 400-120.000.

Bass Pro Shops, Inc.: *See*—
Dubois, Eugene, 4,930,247, Cl. 43-42.310.

Batistic, Ivica: *See*—
Bleckmann, Hans W.; Fennel, Helmut; Graeber, Johannes; Determann, Otto; and Batistic, Ivica, 4,930,845, Cl. 303-100.000.

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Fritz, Andre; and Gerlinger, Jean, 4,930,268, Cl. 52-90.000.

Baty, Kurt F.; and Lamb, Joseph M., to Stratus Computer, Inc. Method and apparatus for monitoring peripheral device communications. 4,931,922, Cl. 364-200.000.

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Forchheim, Hans; and Schlieder, Matthias, 4,930,402, Cl. 91-167.00R.

Baum, Charles S., to Xylem Technologies, Inc. Method of making veneer laminate composite structure. 4,931,124, Cl. 156-245.000.

Baumeister, Hans-Peter; Hickok, William K.; Bernstein, Lawrence J.; DiPietro, Matthew; and Hochreiter, William T., to Eastman Kodak Company. Zero guard-band skip-field video cassette recorder. 4,931,883, Cl. 360-11.100.

Baumgarte, Ulrich; Fikentscher, Rolf; Heimann, Sigismund; Mertens, Heinrich; Schneider, Siegfried; and Vescia, Michele, to BASF Aktiengesellschaft. Aftertreatment of reactive dyeings on cellulose fibers. 4,931,065, Cl. 8-188.000.

Baumgarth, Manfred; Gericke, Rolf; Laes, Ingeborg; De Peyer, Jacques; and Bergmann, Rolf, to Merck Patent Gesellschaft mit beschrankter Haftung. Azachroman derivatives with effects on the cardiovascular system. 4,931,454, Cl. 514-254.000.

Baumgartle, Kenneth M.: *See*—
Knopp, Leslie C.; and Baumgartle, Kenneth M., 4,930,354, Cl. 73-823.000.

Baumgen, Heinz: *See*—
Sackmann, Gunter; Konig, Joachim; and Baumgen, Heinz, 4,931,510, Cl. 525-302.000.

Bausch, Franz-Hubert, to Hamba Maschinenfabrik Hans A. Muller GmbH & Co. KG. System for checking seals in a packaging plant. 4,930,345, Cl. 73-45.400.

Bausch & Lomb Incorporated: *See*—
Bawa, Rajan; and Ruscio, Dominic V., 4,931,279, Cl. 424-427.000.

Bawa, Harinder S.; and Abbey, Christopher P., to Dynamics Corporation of America. Fire door window construction. 4,930,276, Cl. 52-211.000.

Bawa, Rajan; and Ruscio, Dominic V., to Bausch & Lomb Incorporated. Sustained release formulation containing an ion-exchange resin. 4,931,279, Cl. 424-427.000.

Baxter International Inc.: *See*—
Coe, Frederick L.; and Lachman, Michael E., 4,931,039, Cl. 604-53.000.

Bay, Herbert; Eckert, Guenter; and Bergold, Wolfram, to Basf Aktiengesellschaft. Hydrophobization of leather, pelts and leather substitute materials with carboxyl-containing polysiloxanes. 4,931,062, Cl. 8-94.230.

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Adam, Norbert; and Wiedermann, Rolf, 4,931,481, Cl. 521-123.000.
Dobbers, Jurgen; Reizlein, Karl; and Bredtmann, Kurt, 4,931,099, Cl. 106-775.000.
Fest, Christa; Brandes, Wilhelm; Dutzmann, Stefan; Hansaler, Gerd; and Kuck, Karl-Heinz, 4,931,465, Cl. 514-477.000.
Findeisen, Kurt; Lindig, Markus; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 4,931,084, Cl. 71-92.000.
Jensen-Korte, Uta; Schallner, Otto; Stetter, Jorg; Becker, Benedikt; Behrenz, Wolfgang; Stendel, Wilhelm; and Andrews, Peter, 4,931,461, Cl. 514-404.000.
Kleinstuck, Roland; Lensch, Cornelia; Immenkeppel, Michael; Block, Hans-Dieter; and Odenbach, Herbert, 4,931,586, Cl. 562-24.000.
Krippl, Kurt; Schulte, Klaus; Hoffmann, Erwin; and Wiedermann, Rolf, 4,931,480, Cl. 521-99.000.
Lailach, Gunter; and Gerken, Rudolf, 4,931,269, Cl. 423-522.000.
Lamberts, Wilhelm; Sommerfeld, Klaus-Dieter; Bielefeldt, Dietmar; Marhold, Albrecht; and Negele, Michael, 4,931,482, Cl. 521-131.000.
Pakull, Ralf; Eckhardt, Volker; Genz, Joachim; Idel, Karsten; Kricheldorf, Hans-Rytger; and Doring, Volker, 4,931,534, Cl. 528-193.000.
Psaar, Hubertus; and Berneth, Horst, 4,931,567, Cl. 548-455.000.
Rasshofer, Werner, 4,931,595, Cl. 564-393.000.
Sackmann, Gunter; Konig, Joachim; and Baumgen, Heinz, 4,931,510, Cl. 525-302.000.
Schwartz, Ulrich; Grosser, Rolf; Piejko, Karl-Erwin; Bomer, Bruno; and Arit, Dieter, 4,931,525, Cl. 526-305.000.
Uhlemann, Hans; Herold, Heiko; Boeck, Reinhard; and Daun, Hans, 4,931,174, Cl. 209-139.100.

Bazzano, Guido, to Netts S.r.l. Artificial spoon-bait for fishing. 4,930,245, Cl. 43-42.170.

Beach, Allan D.; and Brunton, John S., to ItW New Zealand Limited. Retro-reflectors. 4,930,870, Cl. 350-97.000.

Beal, Peter R.: *See*—
Allen, Jeffrey W.; Beal, Peter R.; and Whinfrey, Dennis R., 4,930,430, Cl. 110-264.000.

Beard, Joseph O.: *See*—
Granger, Stanley W.; Beard, Joseph O.; and Sveen, Frode, 4,930,745, Cl. 251-1.100.

Bechtold, Guy L., to Heil Company, The. Safety monitor. 4,931,772, Cl. 340-573.000.

Beck, Heinz; Frassek, Karl-Heinz; Verhulst, Eduard M.; and Giezen, Egenius A., to AKZO NV. Copolymers for α-β-unsaturated dicarboxylic acid esters wherein said esters are comprised of ethoxylated esters, methods for their production as well as their use as lubricant for the working-up of plastics. 4,931,197, Cl. 252-56.00R.

Beck, James R.; and Mana, Richard K., to Eli Lilly and Company. Plant growth regulating triazoles. 4,931,083, Cl. 71-92.000.

Becker, Benedikt: *See—*
Jensen-Korte, Uta; Schallner, Otto; Stetter, Jorg; Becker, Benedikt; Behrenz, Wolfgang; Stendel, Wilhelm; and Andrews, Peter, 4,931,461, Cl. 514-404.000.
Becker, Dennis L.; Tochacek, Miroslav; and Hansen, Paul E., to Minnesota Mining and Manufacturing Company. Sheet material used to form portions of fasteners. 4,931,343, Cl. 428-95.000.
Becker, Rainer; Eckhardt, Heinz; Eggersdorfer, Manfred; Schindler, Gerhard; and Jansen, Klaas, to BASF Aktiengesellschaft. 1-tert-butoxy-ω-alkenes and their use as scents. 4,931,428, Cl. 512-25.000.
Becton, Dickinson and Company: *See—*
Beiter, Werner, 4,931,044, Cl. 604-248.000.
Bedford, Gerald M.; and Richards, Peter J., to Friction Technology Limited. Method of forming hard facings on materials. 4,930,675, Cl. 228-112.000.
Bee, Rodney D.; and Palmer, Anthony M., to Thomas J. Lipton, Inc. Sublimation method. 4,930,319, Cl. 62-69.000.
Beecham Group p.l.c.: *See—*
Broom, Nigel J. P.; Brooks, Gerald; and Clarke, Brian P., 4,931,434, Cl. 514-192.000.
Beeman, John A.; Leep, James L.; Marvin, Wayne S.; Solt, Floyd R.; and Smith, Troy F., to Mead Corporation, The. Envelope handling system. 4,930,977, Cl. 414-790.800.
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Succari, Shmuel; Gilad, Shalev; Nagler, Michael; Beiber, Avigdor; and Berman, Dov, 4,931,637, Cl. 250-235.000.
Beiter, Werner, to Becton, Dickinson and Company. Blood collection valve. 4,931,044, Cl. 604-248.000.
Belanger, Inc.: *See—*
Astley, Graham, 4,930,424, Cl. 104-172.300.
Belanger, James A.; Wentworth, Robert J.; Turner, Barry S.; and Astley, Graham J., 4,931,244, Cl. 264-154.000.
Belanger, James A.; Wentworth, Robert J.; Turner, Barry S.; and Astley, Graham J., to Belanger, Inc. Method of making a unit nozzle housing. 4,931,244, Cl. 264-154.000.
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Aspnes, David E.; Bhat, Rajaram; Colas, Etienne G.; Florez, Leigh T.; Harbison, James P.; and Studna, Amabrose A., 4,931,132, Cl. 156-601.000.
Krishnan, Komandur R., 4,931,941, Cl. 364-437.000.
Bell, Edward C.: *See—*
Sibbald, Alastair; Webb, Brian C.; Robins, Ian; Ross, John F.; and Bell, Edward C., 4,931,851, Cl. 357-25.000.
Bell, Leslie: *See—*
Kawasaki, Glenn; and Bell, Leslie, 4,931,373, Cl. 435-69.200.
Bell, Ronald D., to Radian Corporation. Low NOX cogeneration process. 4,930,305, Cl. 60-39.060.
Belleride, Paul; and Duhamel, Maurice, to Societe Anonyme dite : Stein Industrie. Device for forming a closed chamber inside two metal pipes to be connected together by arc welding under a protective gas. 4,931,612, Cl. 219-60.00R.
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Matjukhina, Ljudmila I.; Mikhalev, Alexandr S.; Sidoruk, Sergei N.; and Chushenkov, Igor M., 4,931,713, Cl. 318-632.000.
Belthle, Heinz, to Schaudt Maschinenbau GmbH. Thread grinding method and machine. 4,930,265, Cl. 51-288.000.
Benscriscutto, Michael. Golf club swing training device. 4,930,786, Cl. 273-186.00C.
Benczik, Janosne : *See—*
Pelyva, Jeno ; Soptei, Csaba; Kolonics, Zoltan; Karacsonyi, Bela; Balint, Sandor; Benczik, Janosne ; Kayos, Csaba; Lendvai, Laszlo ; and Laszlo, Sandor, 4,931,585, Cl. 562-17.000.
Benedikter, Richard: *See—*
Freisleben, Horst; Scharfenberg, Gottfried; Sepp, Gunther; Benedikter, Richard; and Schnaebele, Werner, 4,930,888, Cl. 356-152.000.
Benjelloun, Malika: *See—*
Torstensson, Lars-Gunnar; Dahlqvist, Per-Arne; and Benjelloun, Malika, 4,931,292, Cl. 426-2.000.
Bennett, Alan N. Portable medical suction device. 4,930,997, Cl. 417-410.000.
Bennetts, Steven A.: *See—*
Kelly, David L.; and Bennetts, Steven A., 4,930,269, Cl. 52-125.500.
Bester, Dean W.; and Dowe, James T., to Deere & Company. Lawn mower battery mounting. 4,930,300, Cl. 56-16.700.
Bentzen, Steen: *See—*
Karash, Karl; and Bentzen, Steen, 4,931,742, Cl. 324-541.000.
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Fischer, Georg; and Propper, Wilhelm, 4,930,619, Cl. 198-803.200.
Juenkersfeld, Harald, 4,930,288, Cl. 53-329.000.
Berg, Lloyd, to Berg, Lloyd. Separation of benzene from acetone by azeotropic distillation. 4,931,145, Cl. 203-69.000.
Bergene, Mark A.: *See—*
Boe, Thomas E.; Bergene, Mark A.; Kittle, Carl E.; and Sparks, Gregory E., 4,931,967, Cl. 364-571.010.
Berger, Fritz, to Elektro-Apparatebau Olten AG. Pushbutton switch. 4,931,607, Cl. 200-524.000.
Berger-Neel, Bonnie; Gershon, Beth K.; and Groff, John P., to Abbott Laboratories. Antimicrobial for in-vitro diagnostic kits. 4,931,446, Cl. 514-254.000.
Berger, Ronald D.: *See—*
Cohen, Richard J.; Appel, Marvin L.; and Berger, Ronald D., 4,930,517, Cl. 128-671.000.
Bergey, James L.: *See—*
Grover, Gary J.; and Bergey, James L., 4,931,464, Cl. 514-423.000.
Berggvist, Jounj R. R.: *See—*
Peltola, Pentti T.; and Berggvist, Jounj R. R., 4,931,140, Cl. 162-193.000.
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DiGiulio, Peter C.; Bergman, Norman J.; and Salazar, Edilberto I., 4,931,712, Cl. 318-625.000.
Bergmann, Rolf: *See—*
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Bergner, Joachim; Danz, Rainer; and Heinz, Hartmut, to Jenoptik Jena GmbH. Achromatic phase retarder arrangement. 4,930,878, Cl. 350-394.000.
Bergold, Wolfram: *See—*
Bay, Herbert; Eckert, Guenter; and Bergold, Wolfram, 4,931,062, Cl. 8-94.230.
Berkey, George E., to Corning Incorporated. Method of making fiber optic coupler. 4,931,076, Cl. 65-4.200.
Berkley, Inc.: *See—*
Jones, Keith A., 4,930,363, Cl. 73-865.700.
Berman, Dov: *See—*
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Berman, Michael F.: *See—*
Lobo, Edward M.; and Berman, Michael F., 4,931,900, Cl. 361-315.000.
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Berner, John M.: *See—*
Mikoll, Joseph F.; Goldfein, Melvin M.; and Berner, John M., 4,930,808, Cl. 280-751.000.
Berner, Paul, to Hoechst Celanese Corporation. Process for aryl-quinone and aryl-naphthoquinone diazide sulfonic acids. 4,931,549, Cl. 534-557.000.
Berneth, Horst: *See—*
Paaar, Hubertus; and Berneth, Horst, 4,931,567, Cl. 548-455.000.
Berning, Peter H.; and Phillips, Roger W., to Flex Products, Inc. Thin film optical variable article and method having gold to green color shift for currency authentication. 4,930,866, Cl. 350-320.000.
Bernstein, Lawrence J.: *See—*
Baumeister, Hans-Peter; Hickok, William K.; Bernstein, Lawrence J.; DiPietro, Matthew; and Hochreiter, William T., 4,931,883, Cl. 360-11.100.
Berol Nobel AB: *See—*
Palicka, Jadwiga, 4,931,215, Cl. 252-546.000.
Berrigan, Paul J.; and Brennan, Michael J., Jr., to Du Pont de Nemours, E. I., and Company. Device for automatically ascertaining capacitance, dissipation factor and insulation resistance of a plurality of capacitors. 4,931,721, Cl. 324-658.000.
Berryman, Leslie N.; Horinek, Herbert J.; Phillippi, Max L.; Prucha, David A.; Reidenbach, Vincent G.; and Stephenson, Stanley V., to Halliburton Company. Slurry mixing apparatus. 4,930,576, Cl. 166-308.000.
Bertleff, Werner: *See—*
Kummer, Rudolf; Merger, Franz; Bertleff, Werner; and Fischer, Rolf, 4,931,590, Cl. 562-590.000.
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Woodard, Dudley H., 4,931,105, Cl. 148-2.000.
Bessho, Akira, to Pioneer Electronic Corporation. Disk player having a vibration dissipating device. 4,932,019, Cl. 369-247.000.
Bestop, Inc.: *See—*
Bruce, Douglas A.; and Essig, Richard C., 4,930,835, Cl. 296-102.000.
Beta Instrument Co., Ltd.: *See—*
Tole, Walter R., 4,931,658, Cl. 250-560.000.
Beth, Dieter: *See—*
Steppe, Erich; and Beth, Dieter, 4,930,918, Cl. 400-719.000.
Bethlehem Steel Corporation: *See—*
Tihansky, Eugene L., 4,930,827, Cl. 294-81.560.
Betz Laboratories, Inc.: *See—*
Chen, Fu, 4,931,188, Cl. 210-697.000.
McDonald, Alexander C.; and Soos, James L., 4,931,206, Cl. 252-180.000.
Beugeladyk, Anthony F.: *See—*
Barnard, Michael A.; and Beugeladyk, Anthony F., 4,930,369, Cl. 74-480.00R.
Bevacqua, Aldo. Building systems. 4,930,270, Cl. 52-126.100.
Bevilacqua, Joseph, to B-Dry Systems. Drain system. 4,930,272, Cl. 52-169.500.
Bhargava, Rameshwar N.: *See—*
de Leeuw, Dagobert M.; Zwicker, Walter K.; and Bhargava, Rameshwar N., 4,931,312, Cl. 427-64.000.
Bhat, Rajaram: *See—*
Aspnes, David E.; Bhat, Rajaram; Colas, Etienne G.; Florez, Leigh T.; Harbison, James P.; and Studna, Amabrose A., 4,931,132, Cl. 156-601.000.
Biagiotti, Guglielmo, to Perini Finanziaria. Apparatus for applying adhesive on tubular cores for rolls of web material and for feeding same cores to a web winding machine. 4,931,130, Cl. 156-446.000.
Bialy, Jacob, to ISPRA - Isreal Product Research Co. Ltd. Versatile grenade launcher. 4,930,242, Cl. 42-105.000.

Bibb, William F.: *See*—
Hoffman, Paul S.; Helsel, Leta O.; Bibb, William F.; and McKinney, Roger M., 4,931,547, Cl. 530-387.000.
BICC plc: *See*—
Tansey, John A.; Davey, Rodney J.; and Sadler, Alan A., 4,930,860, Cl. 350-96.230.
Bice, Kenneth R. Gun barrel cleaning device. 4,930,240, Cl. 42-95.000.
Biedermann, Kurt: *See*—
Bottger, Wolfgang; and Biedermann, Kurt, 4,931,345, Cl. 428-116.000.
Bielefeldt, Dietmar: *See*—
Lamberts, Wilhelm; Sommerfeld, Klaus-Dieter; Bielefeldt, Dietmar; Marhold, Albrecht; and Negele, Michael, 4,931,482, Cl. 521-131.000.
Bierschenk, Thomas R.; Juhlke, Timothy J.; Lagow, Richard J.; and Kawa, Hajimu, to Exfluor Research Corporation. Use of chlorofluoropolyethers as lubricants for refrigerants. 4,931,199, Cl. 252-68.000.
Biing-Yih, Hwang. Joining structures for metal pipes. 4,930,816, Cl. 285-321.000.
Bijl, Hugo; and Vroklage, Sebastiaan J. W., to Duphar International Research B.V. Method of preparing a solid composition of lactulose, and composition so obtained. 4,931,554, Cl. 536-124.000.
Bills, Randolph L., to Ran Free. Microwave-heatable hot pad. 4,931,608, Cl. 219-10.55F.
Binkley, Steven M.; and McCarty, Clinton D. Fuel and air mixture expanding and preheating system. 4,930,484, Cl. 123-546.000.
Biogram AB: *See*—
Ekman, Bo M.; Larsson, Kare V.; Lindahl, Ake R.; and Rothman, Ulf S. E., 4,931,284, Cl. 424-450.000.
Biomed Technology, Inc.: *See*—
Erner, William E., 4,931,472, Cl. 514-661.000.
Bird, Forrest M. Ventilator. 4,930,501, Cl. 128-204.250.
Birdwell, J. C. Fluid means for data transmission. 4,932,005, Cl. 367-83.000.
Bischof und Klein GmbH & Co.: *See*—
Groner, Alois; and Rencurosi, Fabien, 4,930,904, Cl. 383-45.000.
Black, Malcolm H.; and Blade, Robert J., to Burroughs Wellcome Co. Novel pesticides, preparation and use. 4,931,469, Cl. 514-617.000.
Blade, Robert J.: *See*—
Black, Malcolm H.; and Blade, Robert J., 4,931,469, Cl. 514-617.000.
Blair, Bruce A.: *See*—
Herbst, Donald J.; Fay, Richard D.; Frericks, David L.; and Blair, Bruce A., 4,931,018, Cl. 434-234.000.
Blanchard, Gilbert; Garreau, Francois; Prigent, Michel; and Dozieres, Richard, to Pro-Catalyse. Catalyst for the conversion of vehicular exhaust gases and process for preparing the catalyst. 4,931,419, Cl. 502-304.000.
Blanchette, Henry J., to Plastican, Inc. Container lid with a tear skirt. 4,930,656, Cl. 220-276.000.
Bleckmann, Hans W.; Fennel, Helmut; Graeber, Johannes; Determann, Otto; and Batistic, Ivica, to Alfred Teves GmbH. Process and circuit configurstion for controlling a brake system with sequential brake pressure modulation. 4,930,845, Cl. 303-100.000.
Bleibtreu, Alexander, to Maschinenfabrik Reinhausen GmbH. Step selector for a stepped transformer. 4,931,599, Cl. 200-11.00B.
Bleickert, Sonke: *See*—
Zwingel, Dieter; Lochner, Gunther; and Bleickert, Sonke, 4,930,394, Cl. 89-7.000.
Blevins, Charles H., II: *See*—
Foster, George N.; Petty, Herbert E.; Blevins, Charles H., II; and King, Roswell E., III, 4,931,492, Cl. 524-188.000.
Block, Elliott; Bahar, Izak; Cole, Frank; Eaton, Cheryl A.; Jones, Wendy; Sigillo, Eric; Coseo, Mary; Cicia, Nancy J.; Cannon, L. Edward; and Cantarow, Walter, to Hygeia Sciences, Incorporated. Enzyme immunoassays and immunclogic reagents. 4,931,385, Cl. 435-7.000.
Block, Hans-Dieter: *See*—
Kleinstuck, Roland; Lenach, Cornelia; Immenkeppel, Michael; Block, Hans-Dieter; and Odenbach, Herbert, 4,931,586, Cl. 562-24.000.
Bloom, Charles P.: *See*—
Isle, Brian A.; Bloom, Charles P.; Butler, Arch W.; and Spoor, David, 4,931,950, Cl. 364-513.000.
Blost, Elly; and Welkert, Ute, to Allrutan Bio-Produkte GmbH. Storage-stable preparations of wheat vinasse. 4,931,278, Cl. 424-195.100.
Blum, Holger. Stabilized aqueous folic acid preparation. 4,931,442, Cl. 514-249.000.
Blume, Ingo; Peinemann, Klaus-Viktor; Pinnau, Ingo; and Wijmans, Johannes G., to Membrane Technology & Research, Inc. Composite membranes for fluid separations. 4,931,181, Cl. 210-500.270.
Board of Governors for Higher Education, State of Rhode Island and Providence Plantations, The: *See*—
Abushanab, Elie, 4,931,575, Cl. 549-453.000.
Krul, William R., 4,931,394, Cl. 435-240.450.
Board of Regents, The University of Texas System: *See*—
Rochelle, Gary T.; and Jozewicz, Wojciech, 4,931,264, Cl. 423-242.000.
Boatwright, Doyle W.: *See*—
Monte, Woodrow C., 4,931,300, Cl. 426-335.000.
BOC Group, Inc., The: *See*—
Kaplan, Robert H.; LaCava, Alberto; Shirley, Arthur I.; and Ringo, Steven M., 4,931,071, Cl. 55-25.000.
Bode, Robert; and Nicholson, Harlan L. Acoustical length measurement. 4,930,350, Cl. 73-597.000.
Boe, Thomas E.; Bergene, Mark A.; Kittle, Carl E.; and Sparks, Gregory E., to Deere & Company. Control system calibration. 4,931,967, Cl. 364-571.010.
Boeck, Reinhard: *See*—
Uhlemann, Hans; Herold, Heiko; Boeck, Reinhard; and Daun, Hans, 4,931,174, Cl. 209-139.100.
Boehner, Loren W.: *See*—
Kobylenski, Dennis E.; and Boehner, Loren W., 4,930,259, Cl. 51-89.000.
Boehringer Ingelheim KG: *See*—
Lehr, Erich, 4,931,435, Cl. 514-211.000.
Boehringer Mannheim GmbH: *See*—
Priebe, Walter-Gunar; Reinholz, Erhard; Doerge, Liesel; and Stegmeier, Karlheinz, 4,931,462, Cl. 514-419.000.
Rehner, Helmut; Bartl, Knut; Stegmuller, Peter; Tischer, Wilhelm; and Rollinger, Sibylle, 4,931,392, Cl. 435-188.000.
Boeing Company, The: *See*—
Huggins, Raymond W., 4,931,636, Cl. 250-226.000.
Macdonald, Kenneth A. B., 4,930,421, Cl. 102-377.000.
McCarville, Douglas A.; and New, Jeffrey A., 4,931,126, Cl. 156-304.600.
Sharples, G. F., 4,930,398, Cl. 89-1.510.
Tanielian, Minas H., 4,931,353, Cl. 437-200.000.
Bois, Wilhelm; Amberger, Franz; and Buchl, Josef, to Audi AG. Gearshift lever interlock. 4,930,609, Cl. 192-4.00A.
Bomer, Bruno: *See*—
Schwartz, Ulrich; Grosser, Rolf; Piejko, Karl-Erwin; Bomer, Bruno; and Arlt, Dieter, 4,931,525, Cl. 526-305.000.
Bonacchi, Graziano: *See*—
Fedi, Mauro; Bacciarelli, Carla; and Bonacchi, Graziano, 4,931,437, Cl. 514-234.200.
Bonham, Enos A., Jr., to Magma Power Company. Geothermal plant noncondensable gas removal and heat recovery system and method. 4,930,316, Cl. 60-641.500.
Bonicioli, Paolo; Carminati, Gianbattista; and Buonfigliuoli, Giorgio, to Etefin S.p.A. System for automatic control of devices, apparata and peripheral units for signal switching and processing. 4,932,024, Cl. 370-85.900.
Bonneau, Marc: *See*—
Fontaine, Michel; and Bonneau, Marc, 4,931,277, Cl. 424-195.100.
Bonneyrat, Alain; and Langlais, Christian, to Gilson Medical Electronics (France). Piston pump for high performance liquid chromatography. 4,930,991, Cl. 417-18.000.
Boogaards-Konnecker, Henriette S. Method of producing a self-supporting film bearing a positive photographic image and having an overall thickness of less than 50 μm. 4,931,377, Cl. 430-256.000.
Book Covers Inc.: *See*—
Nogueras Dardina, D. Juan, 4,931,346, Cl. 428-182.000.
Borglund, Tomas. Method and apparatus for emptying packages, especially bags. 4,930,968, Cl. 414-412.000.
Borst, Rodney D.; and Niesen, Scott M., to Placon Corporation. Reclosable blister card display package. 4,930,627, Cl. 206-45.230.
Bose Corporation: *See*—
Schreiber, William P., 4,932,060, Cl. 381-24.000.
Bosley, Rodney W., Jr., to Vance Products, Inc. Method and device for removing a stone from a ureter using extracorporeal shock wave lithotripsy. 4,930,496, Cl. 128-24.00A.
Bosserhoff, Georg: *See*—
Wilsberg, Heinz-Manfred; Bosserhoff, Georg; Puchta, Rolf; and Bucheler, Herbert, 4,931,063, Cl. 8-137.000.
Bottger, Wolfgang; and Biedermann, Kurt, to Vorwerk & Co. Interholding GmbH. Structure with a multiply fabric reinforcement and a method for producing same. 4,931,345, Cl. 428-116.000.
Bottinelli, N. Edward; and Kotraba, Norman L., to Zia Technology, Inc. Pneumatic steelmaking vessel and method of producing steel. 4,931,090, Cl. 75-10.160.
Boucard, Michel R. J.; and Francois, Thirion C., to Siemens Aktiengesellschaft. Housing for an electronic circuit. 4,931,908, Cl. 361-395.000.
Boucher, Val G.; Phelps, Weldon L.; and Ekstrand, Daniel R., to Caterpillar Inc. Electrical transmission control mechanism. 4,930,366, Cl. 74-365.000.
Bourgeois, Claude; and Colin, Jean-Yves, to A.D.R.I.A. Method and apparatus intended for the filtration on a membrane of a product such as milk. 4,931,185, Cl. 210-636.000.
Bourgeois, Michel; Chatelin, Roger; and Wattiez, Daniel, to Institut Textile de France. Novel organic mercurial derivatives with antiseptic character. 4,931,577, Cl. 556-123.000.
Boutni, Omar M.; Nelson, Linda H.; Patterson, Dwight J.; Pratt, Charles F.; and Savenije, Herman B., to General Electric Company. Composition. 4,931,503, Cl. 525-67.000.
Bowen, William H. Valve seat refitting apparatus. 4,930,948, Cl. 408-190.000.
Bowers, John: *See*—
Simpson, Raymond W.; Chandler, Donald G.; and Bowers, John, 4,932,037, Cl. 375-1.000.
Boyer, Billy G.; Nelson, Lloyd M.; Soucie, Wayne L.; and Hayes, William K., to Orscheln Co. Brake apparatus with blind cable installing means. 4,930,605, Cl. 188-2.00D.
Boyer, Brett D.; and Eckrich, Thomas M., to Eli Lilly and Company. Method of resolving cis 3-amino-4-(2-(2-furyl)eth-1-yl)-methoxycarbonylmethyl-azetidin-2-one and malic acid salts thereof. 4,931,556, Cl. 540-364.000.
Boyer, Charles C.: *See*—
Dowd, James P.; Boyer, Charles C.; and Gardner, Gary W., 4,931,156, Cl. 204-147.000.

Boyle, Dennis J.: *See*—
Sampson, Craig F.; Sun, Rickson; Barsley, Paul N.; and Boyle, Dennis J., 4,930,911, Cl. 400-28.000.

Bozich, George J.: *See*—
Smedberg, Kenneth L.; Bozich, George J.; and Kotynski, Robert J., 4,930,336, Cl. 72-453.130.

BP Chemicals Limited: *See*—
Crouzet, Pierre, 4,931,193, Cl. 210-768.000.

Brabant, Omer E. Portable stadium seat with extensible and retractable rain cover. 4,930,838, Cl. 297-184.000.

Brackett, Stephen E., to Siemens-Bendix Automotive Electronics Limited. Quiet clutch fan blade. 4,930,990, Cl. 416-223.00R.

Braden, Michael L.; and Allenson, Stephen J., to Nalco Chemical Company. Method for separating solids from water using amine containing polymers. 4,931,191, Cl. 210-725.000.

Bradfisch, Gregory A.: *See*—
Malhotra, Sudarshan K.; Dripps, James E.; Bradfisch, Gregory A.; Wollowitz, Susan; and Knox, Ingrid L., 4,931,452, Cl. 514-344.000.

Bradshaw, Cyril E.: *See*—
Creed, Brian T.; and Bradshaw, Cyril E., 4,930,455, Cl. 123-41.100.

Brahmbhatt, Sudhir R.; and Young, Christopher R., to MG Industries. High-temperature burner. 4,931,013, Cl. 431-10.000.

Brandes, Wilhelm: *See*—
Fest, Christa; Brandes, Wilhelm; Dutzmann, Stefan; Hanssler, Gerd; and Kuck, Karl-Heinz, 4,931,465, Cl. 514-477.000.

Brandl, Rudolf; and Matt, Heinz, to Heckler & Koch, GmbH. Magazine with linkless cartridge feed system. 4,930,400, Cl. 89-34.000.

Brandt, Inc.: *See*—
Melcher, Richard A., 4,931,779, Cl. 340-674.000.

Brandt Manufacturing Systems, Inc.: *See*—
Brandt, Thomas L., 4,931,632, Cl. 250-223.00B.

Brandt, Thomas L., to Brandt Manufacturing Systems, Inc. Variable parameter optical bottle checker. 4,931,632, Cl. 250-223.00B.

Braun Aktiengesellschaft: *See*—
Wolf, Jurgen; Jestadt, Albrecht; Heintke, Hans E.; and Odemer, Michael, 4,930,217, Cl. 30-43.920.

Braun, Peter B., to DOM-Sicherheitstechnik GmbH & Co. KG. Cylinder key switch. 4,931,600, Cl. 200-43.080.

Braun, Steve W.: *See*—
Hodara, Henri; and Braun, Steve W., 4,932,004, Cl. 367-76.000.

Bray, Robert C.; Johnsen, Catherine A.; Bagwell, Timothy L.; and Ishak, Waguih S., to Hewlett-Packard Company. Polyimide damper for surface acoustic wave device. 4,931,752, Cl. 333-151.000.

Breault, John P.: *See*—
Dickau, Ewald F.; and Breault, John P., 4,930,669, Cl. 222-309.000.

Brecht, William B.; Feder, David O.; McAndrews, Joseph M.; and Williamson, Allan J., to C & D Charter Power Systems, Inc. Low float technology battery. 4,931,367, Cl. 429-50.000.

Bredtmann, Kurt: *See*—
Dobbers, Jurgen; Reizlein, Karl; and Bredtmann, Kurt, 4,931,099, Cl. 106-775.000.

Breneman, Bruce C.; Purcell, John R.; and Sarwinski, Raymond E., to General Atomics. Magnetic resonance imaging magnet having minimally symmetric ferromagnetic shield. 4,931,759, Cl. 335-301.000.

Brenke, Matthias; and Koch, Detlef, to Rotring-Werke Riepe KG. Marker or felt tip pen. 4,931,093, Cl. 106-19.000.

Brennan, John; and Eckrich, Thomas M., to Eli Lilly and Company. Method of resolving cis 3-amino-4-(2-furyl)vinyl)-1-methoxycarbonylmethyl-azetidin-2-one and di-p-toluoyl-tartaric acid salts thereof. 4,931,557, Cl. 540-364.000.

Brennan, Michael J., Jr.: *See*—
Berrigan, Paul J.; and Brennan, Michael J., Jr., 4,931,721, Cl. 324-658.000.

Brenneke, William N., to Caterpillar Inc. Burn table. 4,930,756, Cl. 266-49.000.

Brenner, Karl-Heinz; Huang, Alan; and Lohmann, Adolf W., to AT&T Bell Laboratories. Optical shuffle arrangement. 4,931,959, Cl. 364-525.000.

Brenner, Richard, to Inventio AG. Method and apparatus for serving the passenger traffic at a main floor of an elevator installation. 4,930,603, Cl. 187-125.000.

Bridges, John A., to Aladdin Industries Inc. Storage and display case having pivotally mounted cover. 4,930,628, Cl. 206-45.230.

Bridgestone/Firestone, Inc.: *See*—
Lesti, Franco; and Carpentier, Jean M., 4,930,560, Cl. 152-554.000.

Brigham Young University: *See*—
Czirr, J. Bart; and Jensen, Gary L., 4,931,649, Cl. 250-390.070.

Brighton, Jeffrey E., to Texas Instruments Incorporated. Self-aligned nonnested sloped via. 4,931,144, Cl. 174-262.000.

Brindopke, Dieter; and Rieken, Heiko, to Melitta-Werke Bentz & Sohn. Decanter with attached spout-handle and method of making same. 4,930,687, Cl. 222-475.100.

Briot International: *See*—
Lecerf, Michel J. M.; and Longuet, Raynald M. G., 4,930,952, Cl. 409-130.000.

Brisko, William E., Jr.: *See*—
Emmons, Lawrence D.; Mackley, James S.; Stokes, David H.; Stefenel, Rudolph S.; Brisko, William E., Jr.; and Cooper-Hart, Michael A., 4,932,047, Cl. 379-53.000.

Brisson, Alfred G., to Northgate Research, Inc. X-ray aiming fixture. 4,930,509, Cl. 128-653.000.

Bristol Compressors, Inc.: *See*—
Koufeld, Milton M., 4,930,406, Cl. 92-144.000.

Broadhurst, Michael D.; and Cromartie, Thomas H., to ICI Americas Inc. Thiomidate insecticides. 4,931,448, Cl. 514-351.000.

Broadwin, Alan; Vassallo, Charles; Logan, Joseph N.; and Hornlein, Robert W., to Cavitron, Inc. Method and apparatus for providing enhanced tissue fragmentation and/or hemostasis. 4,931,047, Cl. 604-22.000.

Broerman, Steven E., to Vortec Corporation. Air flow apparatus. 4,930,705, Cl. 239-590.500.

Bronstein, Irena Y.; and Voyta, John C., to Tropix, Inc. Methods of using chemiluminescent 1,2-dioxetanes. 4,931,223, Cl. 252-700.000.

Brooks, Calvin F.: *See*—
Cisar, Alan J.; and Brooks, Calvin F., 4,931,092, Cl. 75-244.000.

Brooks, Gerald: *See*—
Broom, Nigel J. P.; Brooks, Gerald; and Clarke, Brian P., 4,931,434, Cl. 514-192.000.

Brooks, Lynwood C.; Fuller, Lloyd J.; Russo, Randolph J.; and Russo, Robert P. Merchandise display system. 4,930,642, Cl. 211-71.000.

Brooks, Robert E.: *See*—
Clark, George L.; Heflinger, Lee O.; Roychoudhuri, Chandrasekhar; Brooks, Robert E.; and Sharma, Madan M., 4,930,855, Cl. 350-96.190.

Broom, Nigel J. P.; Brooks, Gerald; and Clarke, Brian P., to Beecham Group p.l.c. Penem compounds. 4,931,434, Cl. 514-192.000.

Brother Kogyo Kabushiki Kaisha: *See*—
Kawakami, Yasushi, 4,931,987, Cl. 364-900.000.
Sonoda, Takakuni, 4,932,068, Cl. 355-77.000.
Suzuki, Makoto; Mizuno, Shigeru; Sangyoji, Kazuo; and Takagi, Osamu, 4,931,825, Cl. 355-20.000.
Takeda, Susumu, 4,931,958, Cl. 364-521.000.

Brower, Boyd G., to GTE Products Corporation. Fluorescent lamp starter assembly. 4,931,696, Cl. 315-61.000.

Brown, Candice H.; and Fatemi, Homi, to Advanced Micro Devices, Inc. High thermal conductivity/low alpha emission molding compound containing high purity semiconductor filler and integrated circuit package. 4,931,852, Cl. 357-72.000.

Brown, Gerald W., to Kollmorgen Corporation. Method for manufacturing a composite sleeve for an electric motor. 4,930,201, Cl. 29-598.000.

Brown, James L., to Haas Cabinet Co., Inc. Cabinet drawer guide attachment and adjustment assembly. 4,930,739, Cl. 248-220.200.

Brown, Paul P.: *See*—
Schad, Robert D.; and Brown, Paul P., 4,931,234, Cl. 264-40.100.

Brown, Percy B.: *See*—
Baral, Elliott; Brown, Percy B.; Hauptman, Reuben D.; Jaeger, Richard J., Jr.; LaPorta, Frank C.; Lauber, Pamela J.; LeCronier, Richard E.; Nelson, Randall H.; Russell, Thomas L., Jr.; and Ying, Wen-Ping, 4,932,042, Cl. 379-67.000.

Brown, Robert D.; Hogsett, Russell J.; Compton, Richard A.; and Swisher, Thomas W., to Portec, Inc. Attachments for power turns. 4,930,621, Cl. 198-831.000.

Browne, Alan R. Cord strain relief device and associated lamp. 4,931,023, Cl. 439-459.000.

Browne, Ronnie, to Memrox, Inc. Compact manifold valve. 4,930,538, Cl. 137-269.000.

Brownell, Keith H.: *See*—
Baker, Don R.; Walker, Francis H.; and Brownell, Keith H., 4,931,451, Cl. 514-335.000.

Bru-Magniez, Nicole; De Cock, Christian; Poupaert, Jacques; De Keyser, Jean-Luc; and Dumont, Pierre, to Laboratoires UPSA. Process for the preparation of monoesters or diesters of-9,10-endoethano-9,10-dihydroanthracene-11,11-dicarboxylic acid and for the preparation of symmetrical or asymmetrical methylideneamalonates. 4,931,584, Cl. 560-190.000.

Bruce, Douglas A.; and Essig, Richard C., to Bestop, Inc. Weather seal for vehicle top panels. 4,930,835, Cl. 296-102.000.

Bruck, Martin: *See*—
Gerdau, Thomas; Kleiner, Hans-Jerg; Peuckert, Marcellus; Bruck, Martin; and Aldinger, Fritz, 4,931,513, Cl. 525-474.000.

Bruckner-Apparatebau GmbH: *See*—
Koch, Werner; and Ruppert, Gunther, 4,931,064, Cl. 8-149.100.

Bruner, David A., to International Business Machines Corporation. Key switch mechanism and membrane actuator. 4,931,606, Cl. 200-517.000.

Brunet, Michel; Di Giovanni, Patrick; Jouillat, Claude; Lina, Jean-Pierre; and Pennaneac'h, Herve , to Societe Technique de Pulverisation - STEP SA. Precompression metering pump with improved priming. 4,930,999, Cl. 417-552.000.

Brunisholz, Laurent; and Nicolas, Guy, to Cime Bocuze. Process for reducing the disparities in mechanical values of tungsten-nickel-iron alloys. 4,931,252, Cl. 419-23.000.

Brunken, Dean: *See*—
Stout, Mike F.; and Brunken, Dean, 4,931,319, Cl. 427-421.000.

Bruno, John. Receptacle for storage and disposal of potentially injurious implements such as used scalpel blades, hypodermic needles and the like. 4,930,631, Cl. 206-366.000.

Brunsvold, William R.; Conley, Willard E.; Crockatt, Dale M.; and Iwamoto, Nancy E., to International Business Machines Corporation. High sensitivity resists having autodecomposition temperatures greater than about 160° C. 4,931,379, Cl. 430-270.000.

Brunswick Corporation: *See*—
Hoffman, John R., 4,930,775, Cl. 273-37.000.
Newman, Neil A., 4,930,435, Cl. 114-191.000.
Sheridan, Stephen E., 4,930,790, Cl. 277-12.000.

Brunton, John S.: *See*—
Beach, Allan D.; and Brunton, John S., 4,930,870, Cl. 350-97.000.

Brush, Robert W., Jr.; Scharf, Robert M.; Davie, Campbell; Lutsky, Arthur A.; and Siano, Frank S., to Thomas & Betts Corporation.

Method of making an electrical filter connector. 4,930,200, Cl. 29-25.420.

Brust, Thomas B.: *See*—
McColgin, William C.; Brust, Thomas B.; Daly, Robert C.; Jech, Joseph, Jr.; and Lindholm, Robert D., 4,931,351, Cl. 430-323.000.

Bruxvoort, Wesley J.: *See*—
Calhoun, Clyde D.; Foss, George D.; Fleming, Maurice J.; and Bruxvoort, Wesley J., 4,930,266, Cl. 51-293.000.

Brzozowski, Steven J., to General Electric Company. Cryocooler cold head interface receptacle. 4,930,318, Cl. 62-51.100.

BTS Broadcast Television Systems GmbH: *See*—
Eiberger, Berthold; Philipps, Michael; Schiffmann, Rolf; and Ries, Peter, 4,932,041, Cl. 375-120.000.

Bucheler, Herbert: *See*—
Wilsberg, Heinz-Manfred; Bosserhoff, Georg; Puchta, Rolf; and Bucheler, Herbert, 4,931,063, Cl. 8-137.000.

Buchl, Josef: *See*—
Bois, Wilhelm; Amberger, Franz; and Buchl, Josef, 4,930,609, Cl. 192-4.00A.

Buck, Charles E.: *See*—
Ahmed, Fahim U.; Buck, Charles E.; Camara, Michael A.; Cush, James F., Jr.; and Kaeser, James A., 4,931,203, Cl. 252-99.000.

Budecker, Ludwig, to Alfred Teves GmbH. Radial piston pump. 4,930,994, Cl. 417-286.000.

Buehler, Edgar J.; Draeger, James H.; and Koopmans, Rayment G., to Deere & Company. Quick change structure for trim die. 4,930,334, Cl. 72-448.000.

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Kelly, David L.; and Bennetts, Steven A., 4,930,269, Cl. 52-125.500.

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Burns, Richard H., to United States of America, Army. Apparatus and method for aligning ring resonator. 4,930,887, Cl. 356-152.000.

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Waters, George W.; Burr, Charles R.; and Richards, Charles W., IV, 4,932,070, Cl. 455-10.000.

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Black, Malcolm H.; and Blade, Robert J., 4,931,469, Cl. 514-617.000.

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Butler, Arch W.: *See*—
Isle, Brian A.; Bloom, Charles P.; Butler, Arch W.; and Spoor, David, 4,931,950, Cl. 364-513.000.

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Brecht, William B.; Feder, David O.; McAndrews, Joseph M.; and Williamson, Allan J., 4,931,367, Cl. 429-50.000.

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Katznelson, Ron D., 4,932,055, Cl. 380-4.000.

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Peterson, Charles D.; Tutt, James R.; and Cody, John, 4,930,965, Cl. 414-149.000.

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Baldeschwieler, John D.; and Goodrich, Raymond P., Jr., 4,931,361, Cl. 428-402.200.
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Ahmed, Fahim U.; Buck, Charles E.; Camara, Michael A.; Cush, James F., Jr.; and Kaeser, James A., 4,931,203, Cl. 252-99.000.

Cameron, Russell J.; Krape, Richard P.; and Winsand, Robert N., to Ross Operating Valve Company. Valve system and arrangement for on-line valve replacement. 4,930,401, Cl. 91-32.000.

Camino Laboratories, Inc.: *See*—
Klimas, David R., 4,931,049, Cl. 604-165.000.

Canadian Marconi Company: *See*—
Klemes, Marek, 4,931,977, Cl. 364-581.000.

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Charlesworth, Arthur M.; and Pinkney, Harold F. L., 4,931,866, Cl. 358-93.000.

Cannon, L. Edward: *See*—
Block, Elliott; Bahar, Izak; Cole, Frank; Eaton, Cheryl A.; Jones, Wendy; Sigillo, Eric; Coseo, Mary; Cicia, Nancy J.; Cannon, L. Edward; and Cantarow, Walter, 4,931,385, Cl. 435-7.000.

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Ban, Yutaka; and Nagashima, Toshiaki, 4,931,838, Cl. 355-260.000.
Fukaya, Masaki; Kawakami, Soichiro; Itabashi, Satoshi; Terada, Katsunori; Gofuku, Ihachiro; Nakagawa, Katsumi; Hatanaka, Katsunori; Isobe, Yoshinori; Saika, Toshihiro; Kaneko, Tetsuya; Kitahara, Nobuko; and Suzuki, Hideyuki, 4,931,661, Cl. 250-578.100.
Hieda, Teruo; Suzuki, Masao; and Narita, Hitoshi, 4,931,856, Cl. 358-29.000.
Iida, Shigehira; Arai, Takayoshi; Hashizume, Junichiro; Takei, Tetsuya; and Saitoh, Keishi, 4,930,442, Cl. 118-723.000.
Inoue, Hiroshi; Osada, Yoshiyuki; and Inaba, Yutaka, 4,930,875, Cl. 350-333.000.
Iwata, Kazuo; Nishiwaki, Osamu; and Tochihara, Shinichi, 4,931,810, Cl. 346-1.100.
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Kashiwagi, Mayumi; Sasaki, Toshiaki; Mitsumura, Satoshi; and Kato, Masayoshi, 4,930,707, Cl. 241-5.000.
Kawamura, Hideaki; Sakurada, Nobuaki; and Sasaki, Takashi, 4,931,864, Cl. 358-80.000.
Kenmochi, Toshio; and Hashimoto, Takaaki, 4,932,048, Cl. 379-67.000.
Kobayashi, Tadashi, 4,932,012, Cl. 369-13.000.
Matsumoto, Masakazu; Ishikawa, Shozo; Ando, Wataru; Kikuchi, Toshihiro; and Yamazaki, Itaru, 4,931,371, Cl. 430-59.000.
Miyakawa, Akira, 4,931,781, Cl. 340-706.000.
Miyazaki, Takeshi; and Fukui, Tetsuro, 4,931,337, Cl. 428-64.000.
Miyazawa, Seiichi; and Ohtsuka, Mitsuru, 4,932,033, Cl. 372-46.000.
Murata, Shinji; and Ito, Masahiko, 4,930,721, Cl. 242-200.000.
Naito, Masataka; Honjo, Takeshi; Kobayashi, Kenji; Saito, Jun; Shido, Hironori; and Hiroi, Masakazu, 4,930,761, Cl. 270-53.000.
Nakayama, Tadayoshi; Sato, Chikara; Nagasawa, Kenichi; Sasatani, Tomohiko; Yoshimura, Katsuji; Takahashi, Koji; and Kozuki, Susumu, 4,932,066, Cl. 382-56.000.
Nishimura, Tetsuharu; Tsukiji, Masaaki; Ishii, Satoshi; and Ishizuka, Koh, 4,930,895, Cl. 356-356.000.
Sato, Yukio; Watays, Masafumi; Ishii, Hiroaki; and Udagawa, Yutaka, 4,931,815, Cl. 346-154.000.
Shimizu, Isamu; and Fushimi, Masahiro, 4,931,308, Cl. 427-39.000.
Takagi, Hiroshi; Ohmi, Kazuaki; Sugata, Masao; Tsuda, Hisanori; and Ishiwatari, Takahiko, 4,931,692, Cl. 313-503.000.
Takeda, Hiroaki; Ishida, Masato; Abe, Eiichi; and Sato, Isamu, 4,931,882, Cl. 358-474.000.
Takei, Masahiro; and Shinbori, Kenichi, 4,931,878, Cl. 358-335.000.
Yoshihara, Toshiyuki, 4,931,841, Cl. 355-299.000.

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Cooper, Paul V., 4,930,986, Cl. 416-189.000.

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Carl Schenck AG: *See*—
Henschel, Walter; Riesner, Manfred; and Kunstmann, Uwe, 4,931,243, Cl. 264-109.000.

Carlson, Don F., to Acme Manufacturing Company. Integrated buffing and grinding system. 4,930,258, Cl. 51-5.00R.

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Caron, John L.; and Hoffmanns, Frederic. Security railing. 4,930,754, Cl. 256-65.000.
Carpentier, Jean M.: *See—*
Lesti, Franco; and Carpentier, Jean M., 4,930,560, Cl. 152-554.000.
Carr, Richard P.: *See—*
Romberger, John A.; Jones, Robert D.; and Carr, Richard P., 4,931,318, Cl. 427-397.700.
Carrillo, Louis D. Flexible plate dispenser and improved flexible plate. 4,930,662, Cl. 221-45.000.
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Scherf, Timothy P.; Dix, Daniel J.; and Carson, Douglas W., 4,931,917, Cl. 362-371.000.
Carson, Raymond M. Trotline storage reel. 4,930,250, Cl. 43-57.300.
Casey, Jeremiah P.: *See—*
Burgoyne, William F., Jr.; Langsam, Michael; Ford, Michael E.; and Casey, Jeremiah P., 4,931,182, Cl. 210-500.390.
Cass, Richard B. Electrically-conductive titanium suboxides. 4,931,213, Cl. 252-507.000.
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Engelhardt, Friedrich; and Riegel, Ullrich, 4,931,497, Cl. 525-42.000.
Castello, Gregory L., to Edge Enterprises, Inc. Wetness indicator. 4,931,051, Cl. 604-361.000.
Castle, John E.: *See—*
Albisetti, Charles J.; and Castle, John E., 4,931,551, Cl. 536-20.000.
Castle Rock Manufacturing, Inc.: *See—*
Lucht, Orren J.; and Lucht, Charles R., 4,931,826, Cl. 355-28.000.
Castonguay, Roger N.; Klein, Keith W.; Arnold, David; and Ellis, Preston L., to General Electric Company. Molded case circuit breaker movable contact arm arrangement. 4,931,603, Cl. 200-144.00R.
Castro, Walter N., Jr. Model rocket launch system. 4,930,393, Cl. 89-1.814.
Catena, Robert. Copolymers of polyalkylene glycol acrylate and a salt of a quarternized acrylate. 4,931,522, Cl. 526-292.200.
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Boucher, Val G.; Phelps, Weldon L.; and Ekstrand, Daniel R., 4,930,366, Cl. 74-365.000.
Brenneke, William N., 4,930,756, Cl. 266-49.000.
Cauthen, John V.: *See—*
Tolbert, Thomas W.; Dugan, Jeffrey S.; Cauthen, John V.; and Hendrix, James E., 4,931,342, Cl. 428-90.000.
Cavanaugh, David B.: *See—*
Albares, Donald J.; Cavanaugh, David B.; and Trask, Thomas W., 4,930,854, Cl. 350-96.170.
Cavitron, Inc.: *See—*
Broadwin, Alan; Vassallo, Charles; Logan, Joseph N.; and Hornlein, Robert W., 4,931,047, Cl. 604-22.000.
CDC Partners: *See—*
Burnett, Sibley C.; Purcell, John R.; Creedon, William P.; and Joshi, Chandrashekhar H., 4,930,314, Cl. 60-517.000.
Cebal: *See—*
Schneider, Bernard; and Chapet, Gerard, 4,931,245, Cl. 264-161.000.
Cedar, Charles E.: *See—*
Janezich, Robert J.; Cedar, Charles E.; and Dosen, Todd G., 4,930,568, Cl. 165-76.000.
Cederquist, John N., to Environmental Research Institute of Michigan. Multicolor holographic element and apparatus for head-up display applications. 4,930,847, Cl. 350-3.600.
Cego Limited: *See—*
Hutton, Melvin, 4,930,185, Cl. 16-325.000.
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Economopoulos, Marios; and Lambert, Nicole, 4,931,159, Cl. 204-208.000.
Centre d'Etude des Materiaux Organiques pour Technologies Avancees: *See—*
Mercier, Regis; and Sillion, Bernard, 4,931,541, Cl. 528-370.000.
Centre Tech. de L'Industie des Papiers cartons etc.: *See—*
Sabater, Jacques; and Gillet, Gerard, 4,931,659, Cl. 250-571.000.
Cetus Corporation: *See—*
Halenbeck, Robert; Smith, Flint; and Kunitani, Michael, 4,931,543, Cl. 530-351.000.
Kstre, Nandini; and Knauf, Michael J., 4,931,544, Cl. 530-351.000.
Chai, Bruce H. T.: *See—*
Gualtieri, Devlin M.; and Chai, Bruce H. T., 4,931,133, Cl. 156-621.000.
Chambers, Leon E., Jr.: *See—*
Radwanski, Fred R.; Trimble, Lloyd E.; Chambers, Leon E., Jr.; and Connor, Linda A., 4,931,355, Cl. 428-283.000.
Chan, David M. Toy skateboard with steerable truck assemblies. 4,930,794, Cl. 280-11.280.
Chan, Jimmy H.; and Djafar, Roger R. Solid, phytoactive compositions, methods of use and methods of preparation. 4,931,080, Cl. 71-87.000.
Chance, Christopher N.: *See—*
Fleenor, J. Jerome; Chance, Christopher N.; and Mitten, Robert T., 4,930,344, Cl. 73-49.300.
Chandler, Donald G.: *See—*
Simpson, Raymond W.; Chandler, Donald G.; and Bowers, John, 4,932,037, Cl. 375-1.000.
Chang, Tai-Feng: *See—*
Han, Tai-Kang; and Chang, Tai-Feng, 4,930,993, Cl. 417-226.000.
Channell, Alan B., to McNeil (Ohio) Corporation. Suction inlet bowl for a submersible pump. 4,930,982, Cl. 415-121.200.
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Chapman, Donald L.: *See—*
Kimbrough, Robert L.; and Chapman, Donald L., 4,931,597, Cl. 174-48.000.
Charles, Kirk W.: *See—*
Tompkins, E. Neal; Bartholmae, Jack N.; Zuber, Peter A.; and Charles, Kirk W., 4,931,839, Cl. 355-277.000.
Charlesworth, Arthur M.; and Pinkney, Harold F. L., to Canadian Patents and Development Limited. Distributed coaxial light source producing constant target luminance. 4,931,866, Cl. 358-93.000.
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Charlton, David E.: *See—*
Elliott, Charles T.; and Charlton, David E., 4,931,648, Cl. 250-370.100.
Charrier, Dominique: *See—*
Bernard, Jacques; and Charrier, Dominique, 4,931,766, Cl. 340-332.000.
Chatelin, Roger: *See—*
Bourgeois, Michel; Chatelin, Roger; and Wattiez, Daniel, 4,931,577, Cl. 556-123.000.
Chaur Ching, Lai; and Wen Ho, Huang, to Easy Industries Co., Ltd. Cracking device. 4,930,584, Cl. 173-116.000.
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Chen, Fu, to Betz Laboratories, Inc. Polymers for boiler water treatment. 4,931,188, Cl. 210-697.000.
Chen, Fusen H. Anastomosis device. 4,930,502, Cl. 606-150.000.
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Chen, Teng C. Flow controllable spray nozzle. 4,930,704, Cl. 239-579.000.
Chen, Yud-Ren; and Robinson, Steven A., to United States of America, Agriculture. Application of knowledge-based system for grading meat. 4,931,933, Cl. 364-409.000.
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Chernyak, Zinovy A.; Tsvetkov, Alexandr A.; Onischenko, Alexandr M.; Kandala, Anatoly I.; Khrapov, Valery G.; Nunuparov, Georgy M.; Slavinsky, Vladimir M.; Geikhman, Isaak L.; Omelchenko, Nikolai P.; Rafalovich, Boris A.; Silaev, Viktor I.; and Zhdanov, Konstantin F. Method of monitoring hidden coal-rock interface and transducer realizing this method. 4,931,638, Cl. 250-253.000.
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Gontowski, Walter S., 4,931,750, Cl. 331-111.000.
Cherukuri, Subraman R.; and Mansukhani, Gul, to Warner-Lambert Company. Food acid delivery systems containing polyvinyl acetate. 4,931,293, Cl. 426-5.000.
Chestnut, Joseph C. Portable pet house. 4,930,445, Cl. 119-19.000.
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Sundar, Parameshwaran S., 4,931,161, Cl. 208-13.000.
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Marshall, Gerald M.; and Farrington, Allan P., 4,931,357, Cl. 428-284.000.
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Chien, Kuo-Feng. Tire dismantling and setting apparatus. 4,930,966, Cl. 414-427.000.
Chien, Yie W.: *See—*
Kim, Kwon H.; Henderson, Norman L.; and Chien, Yie W., 4,931,281, Cl. 424-448.000.
Chin, Roland L.: *See—*
Owens, Robert A.; Chin, Roland L.; Ferguson, Susan A.; and Lewis, James M., 4,931,380, Cl. 430-296.000.
Chino, Koichi: *See—*
Baba, Tsutomu; Kawamura, Fumio; Chino, Koichi; Tsuchiya, Kiroyuki; Kikuchi, Makoto; and Tamata, Shin, 4,931,222, Cl. 252-628.000.
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Winkler, Hans-Hesning; and Rutschle, Eugen, 4,930,208, Cl. 29-568.000.
Chisso Corporation: *See—*
Furukawa, Kenji; and Terashima, Kanetsugu, 4,931,208, Cl. 252-299.610.
Miya, Shinya; Yoshimura, Takashi; Mise, Takaya; and Yamazaki, Hiroshi, 4,931,417, Cl. 502-117.000.

Chiyoda Chemical Engineering and Construction Co., Ltd.: *See*—
Wakui, Hitoshi; Kiyohara, Nobuo; Nishino, Haruo; and Yamamoto, Osamu, 4,931,263, Cl. 423-215.500.
Chomerics, Inc.: *See*—
Morgan, Noredin H., 4,931,479, Cl. 521-76.000.
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Chouinard, Ronald D.: *See*—
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Christensen, Jorgen: *See*—
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Christoff, William R., to Corning Incorporated. Method of tapering end of capillary tube bore for optic fiber coupling. 4,931,120, Cl. 156-153.000.
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VanAcker, Michael, 4,930,696, Cl. 224-42.45R.
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Shyu, Jia-Ming; and Chuang, Ching-Wang, 4,931,930, Cl. 364-424.010.
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Chung, Yun C., to AT&T Bell Laboratories. Frequency stabilization of long wavelength semiconductor laser via optogalvanic effect. 4,932,030, Cl. 372-32.000.
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Buhlmayer, Peter; Raaetti, Vittorio; Fuhrer, Walter; Stanton, James L.; and Goschl, Richard, 4,931,591, Cl. 564-165.000.
Hubele, Adolf, 4,931,560, Cl. 544-315.000.
Knecht, Hugo; and Luscher, Rene , 4,931,831, Cl. 355-75.000.
Kristinsson, Haukur, 4,931,439, Cl. 514-242.000.
Payne, John D.; and O'Neil, Robert M., 4,931,196, Cl. 252-47.500.
Schurter, Rolf; Kunz, Walter; and Nyfeler, Robert, 4,931,581, Cl. 560-18.000.
Surber, Werner; Iqbal, Abul; and Stern, Christian, 4,931,566, Cl. 548-453.000.
Wirth, Hermann O.; and Friedrich, Hans-Helmut, 4,931,576, Cl. 549-514.000.
Cichoski, Richard; and Kilpinen, Michael, to ASC Incorporated. Boot cover for a convertible vehicle. 4,930,833, Cl. 296-136.000.
Cicia, Nancy J.: *See*—
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Cime Bocuze: *See*—
Brunisholz, Laurent; and Nicolas, Guy, 4,931,252, Cl. 419-23.000.
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Bagalini, Dante, 4,931,758, Cl. 335-174.000.
Cirrito, Vincent; Koubek, Kevin J.; and Quadrini, John A., to Grumman Aerospace Corporation. Heat pipe cooled electronic circuit card. 4,931,905, Cl. 361-385.000.
Cirrus Logic, Inc.: *See*—
Ravindra, H.; Patil, Suhas S.; Lin, Ernest S.; Assar, Mahmud M.; and Reddy, Dayakar, 4,931,946, Cl. 364-490.000.
Cisar, Alan J.; and Brooks, Calvin F., to Dow Chemical Company, The. Method for producing metal bonded magnets. 4,931,092, Cl. 75-244.000.
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Woodard, Robert W.; Lucht, Eric T.; and Clark, Danny L., 4,930,744, Cl. 248-642.000.
Clark Equipment Company: *See*—
Henline, John W., 4,930,589, Cl. 180-19.100.
Clark, George L.; Heflinger, Lee O.; Roychoudhuri, Chandrasekhar; Brooks, Robert E.; and Sharma, Madan M., to TRW Inc. Wavelength multiplexing of lasers. 4,930,855, Cl. 350-96.190.
Clarke, Brian P.: *See*—
Broom, Nigel J. P.; Brooks, Gerald; and Clarke, Brian P., 4,931,434, Cl. 514-192.000.
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Clorox Company, The: *See*—
Cramer, Randall J.; and Haendler, Blanca L., 4,931,207, Cl. 252-187.260.
Clough, John M.; and Godfrey, Christopher R. A., to Imperial Chemical Industries PLC. Fungicides. 4,931,438, Cl. 514-241.000.
Coastvision: *See*—
Keeley, Edward M., 4,931,228, Cl. 264-2.600.
Coca-Cola Company, The: *See*—
Rudick, Arthur G., 4,930,555, Cl. 141-98.000.
Rudick, Arthur G., 4,930,666, Cl. 222-181.000.
Cochran, Eugene R.: *See*—
Cohen, Donald K.; Ayres, James D.; and Cochran, Eugene R., 4,931,630, Cl. 250-201.300.
Codex Corporation: *See*—
Greszczuk, John A., 4,931,250, Cl. 375-8.000.
Cody, John: *See*—
Peterson, Charles D.; Tutt, James R.; and Cody, John, 4,930,965, Cl. 414-149.000.
Coe, Bill J. Cross braced airfoil. 4,930,727, Cl. 244-145.000.
Coe, Frederick L.; and Lachman, Michael E., to Baxter International Inc. Ventricular catheter introducer. 4,931,039, Cl. 604-53.000.
Coffenberry, Norman D., to SDI Operating Partners, L.P. Freeze plug. 4,930,459, Cl. 123-41.150.
Cofimco S.r.l.: *See*—
Mosiewicz, Antonio, 4,930,989, Cl. 416-204.00R.
Cohen, Donald K.; Ayres, James D.; and Cochran, Eugene R., to Wyko Corporation. Apparatus and method for automatically focusing an interference microscope. 4,931,630, Cl. 250-201.300.
Cohen, Irun R.: *See*—
Shinitzky, Meir; and Cohen, Irun R., 4,931,275, Cl. 424-88.000.
Cohen, Richard J.; Appel, Marvin L.; and Berger, Ronald D., to Massachusetts Institute of Technology. Method and apparatus for physiologic system identification. 4,930,517, Cl. 128-671.000.
Cohen, Robert A. Medical examination garment. 4,930,161, Cl. 2-114.000.
Colas, Etienne G.: *See*—
Aspnes, David E.; Bhat, Rajaram; Colas, Etienne G.; Florez, Leigh T.; Harbison, James P.; and Studna, Amabrose A., 4,931,132, Cl. 156-601.000.
Colbaugh, Michael E.: *See*—
Asars, Juris A.; and Colbaugh, Michael E., 4,931,684, Cl. 313-3.000.
Cole, Anthony R., to Square D Company. Loadcenter busbar retention. 4,931,898, Cl. 361-361.000.
Cole, Anthony R., to Square D Company. Bushbar barrier protective members. 4,931,902, Cl. 361-354.000.
Cole, Anthony R., to Square D Company. Loadcenter mounting rail adapter. 4,931,903, Cl. 361-359.000.
Cole, Frank: *See*—
Block, Elliott; Bahar, Izak; Cole, Frank; Eaton, Cheryl A.; Jones, Wendy; Sigillo, Eric; Coseo, Mary; Cicia, Nancy J.; Cannon, L. Edward; and Cantarow, Walter, 4,931,385, Cl. 435-7.000.
Colgate-Palmolive Company: *See*—
Ahmed, Fahim U.; Buck, Charles E.; Camara, Michael A.; Cush, James F., Jr.; and Kaeser, James A., 4,931,203, Cl. 252-99.000.
Cao, Hoai-Chau; and Houben, Marie-Christine, 4,931,195, Cl. 252-8.800.
Gaffar, Abdul; Polefka, Thomas G.; Feriauto, Robert J., Jr.; and Crisafulli, Rosemarie M., 4,931,273, Cl. 424-52.000.
Julesmont, Jean, 4,931,201, Cl. 252-91.000.
Misevich, Kenneth W.; and Mintel, Thomas E., 4,931,356, Cl. 428-283.000.
Colin, Jean-Yves: *See*—
Bourgeois, Claude; and Colin, Jean-Yves, 4,931,185, Cl. 210-636.000.
Collins, Ellen A. E. Method and apparatus for cutting planar pieces into patterned shapes. 4,930,382, Cl. 83-13.000.
Collins, Philip I.: *See*—
Jeffrey, A. K.; Marsh, David J.; and Collins, Philip I., 4,931,723, Cl. 371-22.300.
Collins, Thomas J.: *See*—
Karas, Joel; and Collins, Thomas J., 4,932,051, Cl. 379-399.000.
Colorocs Corporation: *See*—
Tompkins, E. Neal; Bartholmae, Jack N.; Zuber, Peter A.; and Charles, Kirk W., 4,931,839, Cl. 355-277.000.
Colpack, Arthur Joseph: *See*—
Chen, Chin-Lung, 4,930,175, Cl. 12-142.00R.
Columbia Parcar Corp.: *See*—
Lanius, Charles; and Gilbertson, Mark, 4,930,591, Cl. 180-65.100.
Colvin, David S., to David S. Colvin. Wrench opening engagement surface configuration. 4,930,378, Cl. 81-121.100.
Combi Co., Ltd.: *See*—
Takahashi, Takehiko; Ishii, Yoshiyasu; and Matsuda, Hiroaki, 4,930,697, Cl. 224-275.000.
Combustion Engineering Europe: *See*—
Darchambeau, Alain, 4,931,180, Cl. 210-414.000.
Comer, Stewart A.: *See*—
Dev, Roger H.; Steinberg, Gabriel; Kam, John B.; and Comer, Stewart A., 4,932,026, Cl. 370-94.100.
Cominco Ltd.: *See*—
Manwell, Robert E.; and Sutherland, Charles A., 4,930,757, Cl. 266-270.000.
Commissariat a l'Energie Atomique: *See*—
Sibuet, Henri, 4,931,137, Cl. 156-656.000.
Communications Satellite Corporation: *See*—
Asaal, Francois T.; Evans, John V.; Mahle, Christoph E.; Zaghloul, Amir I.; and Gupta, Ramesh K., 4,931,802, Cl. 342-356.000.
Compax Engineering & Development Ltd.: *See*—
Prihoda, Peter J., 4,930,556, Cl. 144-347.000.
Compton, Richard A.: *See*—
Brown, Robert D.; Hogsett, Russell J.; Compton, Richard A.; and Swisher, Thomas W., 4,930,621, Cl. 198-831.000.
Conley, Willard E.: *See*—
Brunsvold, William R.; Conley, Willard E.; Crockatt, Dale M.; and Iwamoto, Nancy E., 4,931,379, Cl. 430-270.000.
Connor, David T.; Mullican, Michael D.; Sorenson, Roderick J.; and Thueson, David O., to Warner-Lambert Company. Method for treating acute respirator distress syndrome. 4,931,459, Cl. 514-381.000.
Connor, Linda A.: *See*—
Radwanski, Fred R.; Trimble, Lloyd E.; Chambers, Leon E., Jr.; and Connor, Linda A., 4,931,355, Cl. 428-283.000.

Conoco Inc.: *See*—
Romine, Hugh E., 4,931,162, Cl. 208-41.000.
Consolidated Papers, Inc.: *See*—
Shafranski, David J., 4,931,141, Cl. 162-255.000.
Continental Plastics, Inc.: *See*—
Dutt, Herbert V.; and Lewis, Duane H., 4,930,647, Cl. 215-252.000.
Control Data Corporation: *See*—
Stoica, Susana, 4,931,722, Cl. 371-22.500.
Convault, Inc.: *See*—
Lindquist, Thomas A.; and Bambacigno, Ralph, 4,931,235, Cl. 264-40.100.
Convery, Joseph J. Imaging with combined alignment fixturing, illumination and imaging optics. 4,930,872, Cl. 350-321.000.
Cook, Peter W.; and Montoye, Robert K., to International Business Machines Corporation. Apparatus for determining if there is a loss of data during a shift operation. 4,931,970, Cl. 364-715.080.
Cook, Peter W.; and Montoye, Robert K., to International Business Machines Corporation. Partial decode shifter/rotator. 4,931,971, Cl. 364-715.080.
Cooper, Allan S.: *See*—
Maud, John R.; and Cooper, Allan S., 4,931,804, Cl. 346-93.000.
Cooper-Hart, Michael A.: *See*—
Emmons, Lawrence D.; Mackley, James S.; Stokes, David H.; Stefenel, Rudolph S.; Brisko, William E., Jr.; and Cooper-Hart, Michael A., 4,932,047, Cl. 379-53.000.
Cooper Industries, Inc.: *See*—
LeCourt, William N., 4,931,896, Cl. 361-73.000.
Cooper, Michael E.: *See*—
Ray, Jefferson L.; and Cooper, Michael E., 4,931,043, Cl. 604-228.000.
Cooper, Paul V., to Carborundum Company, The. Apparatus for immersing solids into fluids and moving fluids in a linear direction. 4,930,986, Cl. 416-189.000.
Cooper, Robert P., to Applied Vascular Devices, Inc. Parallel jaw spring clip and method of making same. 4,931,058, Cl. 606-158.000.
Coors Porcelain Company: *See*—
Roy, Donald W.; and Hastert, James L., 4,930,731, Cl. 244-316.000.
Coppa, Anthony P., to General Electric Company. Truss beam attachment apparatus. 4,930,930, Cl. 403-171.000.
Corda, Giuseppe, to SGS-Thomson Microelectronics S.p.A. Floating gate memory with sidewall tunnelling area. 4,931,847, Cl. 357-23.500.
Cornell Research Foundation, Inc.: *See*—
McLafferty, Fred W., 4,931,639, Cl. 250-282.000.
Moon, Francis C., 4,931,732, Cl. 324-228.000.
Corning Incorporated: *See*—
Berkey, George E., 4,931,076, Cl. 65-4.200.
Chistoff, William R., 4,931,120, Cl. 156-153.000.
Corning Limited: *See*—
Tassey, John A.; Davey, Rodney J.; and Sadler, Alan A., 4,930,860, Cl. 350-96.230.
Corradini, Paolo; De Rosa, Claudio; Guerra, Gaetano; Nicolais, Luigi; Petraccone, Vittorio; and Attalla, Giancarlo, to Montedison S.p.A. Manufactured articles based on isotactic polypropylene having a highly oriented structure. 4,931,325, Cl. 428-35.700.
Corrigan, Patrick J.: *See*—
Gibson, Michael S.; Hawkins, Larry N.; Peffly, Marjorie M.; Kenneally, Corey J.; and Corrigan, Patrick J., 4,931,552, Cl. 536-119.000.
Corsini, Florent, to Ets A. Colly. Table with adjustable convexity for a press brake, bed or the like. 4,930,339, Cl. 72-482.000.
Coseo, Mary: *See*—
Block, Elliott; Bahar, Izak; Cole, Frank; Eaton, Cheryl A.; Jones, Wendy; Sigillo, Eric; Coseo, Mary; Cicia, Nancy J.; Cannon, L. Edward; and Cantarow, Walter, 4,931,385, Cl. 435-7.000.
Costa, Peter F.: *See*—
Holmes, William A.; and Costa, Peter F., 4,931,042, Cl. 604-164.000.
Cote, Denis, to Sport Maska Inc. Hockey glove having lateral padded wart with split and flexible insert. 4,930,162, Cl. 2-161.00A.
Cothrell, LeRoy E.: *See*—
Feichtmeir, Raymond A.; Cothrell, LeRoy E.; Moon, Jack E.; and Turner, Ted R., 4,931,113, Cl. 156-64.000.
Cotter, Terrence; Anderson, Theodore; Gasser, Robert; Kryk, Lewis R.; and Rieple, Theodore R., to Diversey Corporation. Detergent pellet composition and process therefor. 4,931,202, Cl. 252-99.000.
Cotteret, Jean: *See*—
Grollier, Jean-Francois; Cotteret, Jean; and Rosembaum, Georges, 4,931,066, Cl. 8-410.000.
Courtright, Steven B.; and Barrett, Kevin F., to Wm. Wrigley Jr. Company. Chewing gum containing high-potency sweetener particles with modified zein coating. 4,931,295, Cl. 426-5.000.
Cousiminer, Joseph J.: *See*—
Shanbhag, Sudhakar; and Cousiminer, Joseph J., 4,931,298, Cl. 426-296.000.
Cousino, Bernard A., to Cousino Microloop Corporation. Tape player assembly having a capstan mounted on a pivotal plate. 4,931,890, Cl. 360-93.000.
Cousino Microloop Corporation: *See*—
Cousino, Bernard A., 4,931,890, Cl. 360-93.000.
Cousminer, Joseph J.: *See*—
Shanbhag, Sudhakar P.; and Cousminer, Joseph J., 4,931,296, Cl. 426-243.000.
Coussemacq, Jean M.: *See*—
Fourrey, Francois; Deley, Serge; and Coussemacq, Jean M., 4,930,736, Cl. 248-430.000.
Covington, J. Stansill; McBride, Michael A.; and Hayes, Michael E., to University of Tennessee Research Corporation, The. Method for the disposal of hazardous non-polar organic wastes. 4,931,192, Cl. 210-751.000.
Cowger, Bruce; Nielsen, Niels J.; and Dion, John H., to Hewlett-Packard Company. Thermal ink jet pen having a feedtube with improved sizing and operational with a minimum of depriming. 4,931,811, Cl. 346-140.00R.
Cramer, Randall J.; and Haendler, Blanca L., to Clorox Company, The. Bleaching and bluing composition and method. 4,931,207, Cl. 252-187.260.
Creed, Brian T.; and Bradshaw, Cyril E., to Eaton Corporation. Controlling engine coolant flow and valve assembly therefor. 4,930,455, Cl. 123-41.100.
Creedon, William P.: *See*—
Burnett, Sibley C.; Purcell, John R.; Creedon, William P.; and Joshi, Chandrashekhar H., 4,930,314, Cl. 60-517.000.
Crego, John B.; Sheehan, Ronald T.; and VanGinhoven, Robert M., to Ford New Holland, Inc. Leaf loading method. 4,930,530, Cl. 134-6.000.
Crema, Stefano C.: *See*—
Kucera, Clare H.; Crema, Stefano C.; Roznowski, Michael D.; Konrad, Gerd; and Hartmann, Heinrich, 4,931,489, Cl. 523-130.000.
Creswick, M. Martin, to Meridian Micro-Systems Ltd. Transponder and interrogator. 4,931,788, Cl. 340-825.540.
Crisafulli, Rosemarie M.: *See*—
Gaffar, Abdul; Polefka, Thomas G.; Ferlauto, Robert J., Jr.; and Crisafulli, Rosemarie M., 4,931,273, Cl. 424-52.000.
Crisanti, Joseph S. Insect trap. 4,930,251, Cl. 43-107.000.
Crockatt, Dale M.: *See*—
Brunsvold, William R.; Conley, Willard E.; Crockatt, Dale M.; and Iwamoto, Nancy E., 4,931,379, Cl. 430-270.000.
Croitoriu, Natan; Dror, Jacob; Goldenberg, Ephraim; Mendelovic, David; and Israel, Ganot, to Rauiot University Authority for Applied Research and Industrial Development Ltd. Hollow fiber waveguide and method of making same. 4,930,863, Cl. 350-96.320.
Cromartie, Thomas H.: *See*—
Broadhurst, Michael D.; and Cromartie, Thomas H., 4,931,448, Cl. 514-351.000.
Cronin, Theresa A.: *See*—
Lalezari, Farzin; Munson, Michael G.; and Cronin, Theresa A., 4,931,808, Cl. 343-753.000.
Cross, Robert J.: *See*—
Barabino, William A.; and Cross, Robert J., 4,931,274, Cl. 424-70.000.
Crouzet, Pierre, to BP Chemicals Limited. Treatment of catalyst particles. 4,931,193, Cl. 210-768.000.
Crown Products Company, Inc.: *See*—
Tuggler, William P., Jr., 4,930,815, Cl. 285-158.000.
Crystaloid Electronics, Inc.: *See*—
Ferrato, Joseph P.; and Ferrato, Julie C., 4,931,209, Cl. 252-299.630.
Cselt - Centro Studi E Laboratori Telecomunicazioni S.P.A.: *See*—
Grego, Giorgio, 4,930,853, Cl. 350-96.140.
Csepel Autogyar: *See*—
Simonyi, Sandor; Torocsik, Laszlo ; and Valoczi, Gyorgy, 4,930,374, Cl. 74-866.000.
Cullo, Leonard A.; Nagle, Elliott V., Jr.; Restelli, Edward F., Jr.; and Yogan, Thomas J., to Aristech Chemical Corporation. Catalyst comprising potassium and cesium pyrosulfates with vanadium pentoxide and anatase. 4,931,418, Cl. 502-218.000.
Cummings, Joel W.; and Teodorescu, Ionel E., to Pfizer Hospital Products Group, Inc. Compression anastomosis coupling assembly. 4,931,057, Cl. 606-153.000.
Cummings, Peter A.; and Sears, Ronald E. Skylight frame and panel assembly. 4,930,274, Cl. 52-200.000.
Cummins Engine Company, Inc.: *See*—
Fisher, Frank B.; and Langdon, Paul J., 4,930,979, Cl. 415-58.400.
Cunningham, Roy D., to Southern Lure Company. Double hook fish lure with adjustable trailer hook. 4,930,246, Cl. 43-42.280.
Cush, James F., Jr.: *See*—
Ahmed, Fahim U.; Buck, Charles E.; Camara, Michael A.; Cush, James F., Jr.; and Kaeser, James A., 4,931,203, Cl. 252-99.000.
Cutler, Winnifred B.; Preti, George; and Huggins, George R., to Monell Chemical Senses Center; and University of Pa. Axillary androstenol and dehydroepiandrosterone as fertile period onset indicators. 4,931,403, Cl. 436-65.000.
Cvijanovich, George B., to AMP Incorporated. Machine readable memory card with capacitive interconnect. 4,931,991, Cl. 365-52.000.
Cyb, Frederick F. Heat-resistant exhaust manifold and method of preparing same. 4,930,678, Cl. 228-176.000.
Cyprus Mines Corporation: *See*—
Weber, Kenneth E., 4,931,493, Cl. 524-375.000.
Czerwinski, Kenneth S.; Gabany, Eugene; Sharma, Shanti S.; and Turko, John W., to Fuel Concepts, Inc. Gaseous fueled torch apparatus and fueling module therefor. 4,930,550, Cl. 137-334.000.
Czirr, J. Bart; and Jensen, Gary L., to Brigham Young University. Neutron coincidence calorimeter. 4,931,649, Cl. 250-390.070.
D'Abrera, Francis: *See*—
Rawstron, Philip J. M.; and D'Abrera, Francis, 4,930,938, Cl. 405-204.000.
Dackus, Arnold J. G., to Rijnstaal B.V. Powder-filled welded steel tube and method for the continuous manufacture thereof. 4,930,547, Cl. 138-171.000.
Dacral, S.A.: *See*—
Marguier, Gilbert, 4,931,074, Cl. 148-248.000.

Dague, Elwood D. Holding device for milling machines. 4,930,954, Cl. 409-136.000.

Dahlqvist, Per-Arne: *See*—
Torstensson, Lars-Gunnar; Dahlqvist, Per-Arne; and Benjelloun, Malika, 4,931,292, Cl. 426-2.000.

Dai-Ichi Kogyo Seiyaku Co., Ltd.: *See*—
Sato, Kazuo; and Komori, Masahiro, 4,931,524, Cl. 527-301.000.

Daicel Chemical Industries, Ltd.: *See*—
Okamoto, Yoshio; Hatada, Koichi; Shibata, Tohru; Namikoshi, Hajime; and Okamoto, Ichiro, 4,931,184, Cl. 210-635.000.

Daidotokushuko Kabushikikaisha: *See*—
Sasaki, Takeshi; Takakuwa, Yoshio; Haruna, Takayuki; and Yamada, Kiyoharu, 4,930,380, Cl. 82-117.000.

Daiichi Denshi Kogyo Kabushiki Kaisha: *See*—
Ohtsuki, Tomonari; Inoue, Takakatsu; and Tanaka, Yoshiaki, 4,931,622, Cl. 235-487.000.

Daikin Industries Ltd.: *See*—
Arase, Takuya; Tokunaga, Katsushi; and Daimon, Shigeo, 4,931,198, Cl. 252-62.510.
Kawachi, Shoji; Tomoda, Masayasu; Oka, Masahiko; Furukawa, Yasuyoshi; and Tanaka, Hiroyuki, 4,931,511, Cl. 525-326.300.

Daikoku, Keisuke; and Umehara, Kazuhiro, to Suzuki Jidosha Kogyo Kabushiki Kaisha. Idling rotating speed control system of outboard engine. 4,930,475, Cl. 123-339.000.

Daimler-Benz AG: *See*—
Albrecht, Hans; Reiniger, Siegfried; Lauer, Wolfgang; Spies, Hans; Laucht, Horst; and Spies, Martin, 4,931,767, Cl. 340-425.500.
Gluck, Roland; Heilemann, Otto; and Klingmann, Rolf, 4,930,792, Cl. 277-235.00B.
Korner, Wolf-Dietrich; and Harr, Thomas, 4,930,471, Cl. 123-196.00R.
Letsche, Ulrich, 4,930,464, Cl. 123-90.120.
Tattermusch, Peter; and Bartel, Gunter, 4,930,804, Cl. 280-690.000.

Daimon, Shigeo: *See*—
Arase, Takuya; Tokunaga, Katsushi; and Daimon, Shigeo, 4,931,198, Cl. 252-62.510.

Dainichiseika Color & Chemicals Mfg. Co.: *See*—
Hasegawa, Masaru; Suda, Osamu; Kohno, Hisao; Sekino, Toshifumi; Umezaki, Tetsuhiro; and Tanaka, Norio, 4,931,349, Cl. 430-58.000.

Dainichiseika Color & Chemicals Mfg. Co., Ltd.: *See*—
Hoshino, Akira; Saji, Mikio; and Fujii, Shigeaki, 4,931,360, Cl. 428-328.000.

Dainippon Ink and Chemicals, Inc.: *See*—
Amaya, Shinji; Iwanari, Yoshiyuki; Shinzo, Kinji; Kogawara, Toshiro; Yamazaki, Syuuichi; Shimizu, Seiichi; and Kuriyama, Kazuya, 4,931,370, Cl. 430-45.000.

Dainippon Plastics Co., Ltd.: *See*—
Yoshida, Yasuo; Kakinuma, Tadashi; Sakurai, Tadashi; Kishima, Yoshio; and Kinugasa, Hirofumi, 4,931,655, Cl. 250-492.100.

Dainippon Screen Mfg. Co., Ltd.: *See*—
Taniguchi, Hisayuki, 4,931,861, Cl. 358-75.000.

Dale, Jack F. Bladed tool holder. 4,930,641, Cl. 211-70.600.

Dale, James L.: *See*—
Titsworth, Raymond; Lipe, J. Tom; Dale, James L.; Monroe, Hanford D.; and Hill, Jerry M., 4,931,964, Cl. 364-559.000.

Dalnekoff, Stanley; and Schneider, Michael L., to Travelsoft, Inc. Computerized system with means to automatically clear and sell wait-listed customer reservations. 4,931,932, Cl. 364-407.000.

Dalton, Stanley: *See*—
Fultz, Clinton; and Dalton, Stanley, 4,930,681, Cl. 229-114.000.

Daly, Robert C.: *See*—
McColgin, William C.; Brust, Thomas B.; Daly, Robert C.; Jech, Joseph, Jr.; and Lindholm, Robert D., 4,931,351, Cl. 430-323.000.

Dam Patent A/S: *See*—
Olsen, Terje; Lekven, Nils C.; and Hartai, Julius, 4,931,730, Cl. 324-209.000.

Dana-Farber Cancer Institute: *See*—
Griffin, James D., 4,931,395, Cl. 435-240.270.

Daniel, Richard A.; Rowson, Stuart C.; Barnhart, James E.; and Paek, Woonsuk, to NCR Corporation. Computer system clock generator for generating tuned multiple clock signals. 4,931,986, Cl. 364-900.000.

Danielsaen, Tore; and Herfurth, Eike, to Elkem a/s. Method for adding silica fume to dry shotcrete mixture. 4,931,098, Cl. 106-638.000.

Dantlgraber, Jorg, to Mannesmann Rexroth GmbH. Exhaust and inlet line brake valves for hydrostatic motor. 4,930,311, Cl. 60-406.000.

Dany, Franz-Josef; Klassen, Horst; Adrian, Renate; Prell, Hedwig; and Kalteyer, Gerhard, to Hoechst Aktiengesellschaft. Tooth pastes, cleaning agent for tooth pastes based on dicalcium phosphate-dihydrate, and process for making such cleaning agent. 4,931,272, Cl. 424-49.000.

Danz, Rainer: *See*—
Bergner, Joachim; Danz, Rainer; and Heinz, Hartmut, 4,930,878, Cl. 350-394.000.

Darchambeau, Alain, to Combustion Engineering Europe. Self cleaning filtering apparatus. 4,931,180, Cl. 210-414.000.

DaSilveira, John A. Cattle stanchion. 4,930,452, Cl. 119-148.000.

Data Products Corporation: *See*—
Patterson, Laurence O., 4,930,684, Cl. 222-325.000.

Daun, Hans: *See*—
Uhlemann, Hans; Herold, Heiko; Boeck, Reinhard; and Daun, Hans, 4,931,174, Cl. 209-139.100.

Davey, Rodney J.: *See*—
Tansey, John A.; Davey, Rodney J.; and Sadler, Alan A., 4,930,860, Cl. 350-96.230.

David, John C.: *See*—
Fleischer, Mathew W.; and David, John C., 4,930,581, Cl. 172-6.000.

David S. Colvin: *See*—
Colvin, David S., 4,930,378, Cl. 81-121.100.

Davidson, Wayne A.; and Larson, Daniel H., to AT&T Bell Laboratories. Proximity detection for telecommunications features. 4,932,050, Cl. 379-211.000.

Davie, Campbell: *See*—
Brush, Robert W., Jr.; Scharf, Robert M.; Davie, Campbell; Lutsky, Arthur A.; and Siano, Frank S., 4,930,200, Cl. 29-25.420.

Davies, Thomas J.: *See*—
Pfennings, Leonardus C. M. G.; Voss, Peter H.; O'Connell, Cormac M.; Phelan, Cathal G.; Davies, Thomas J.; and Ontrop, Hans, 4,931,667, Cl. 307-443.000.

Davis, Larry: *See*—
Effland, Richard C.; Klein, Joseph T.; Olsen, Gordon E.; and Davis, Larry, 4,931,457, Cl. 514-349.000.

Davis, Timothy J.: *See*—
Krause, Vernon E.; and Davis, Timothy J., 4,930,252, Cl. 47-40.500.

Davison, Kenneth. Apparatus for patient hydrotherapy and manipulative treatment by a therapist. 4,930,169, Cl. 4-559.000.

Davlyn Manufacturing Co., Inc.: *See*—
Weil, Thomas L., 4,931,326, Cl. 428-35.800.

Day, Stephen: *See*—
Hutt, Peter R.; and Day, Stephen, 4,931,725, Cl. 324-142.000.

de la Haye, Cornelis F., to Koppens Automatic Fabrieken B.V. Hose storing apparatus. 4,930,717, Cl. 242-86.000.

Dean, Jill P.: *See*—
Leshik, Richard R.; Dean, Jill P.; and Krimm, Dagmar, 4,931,302, Cl. 426-548.000.

Dearman, Timothy C. Apparatus for uprooting plants. 4,930,825, Cl. 294-50.900.

De Beule, John A.: *See*—
Katircioglu, Haluk; De Beule, John A.; Mukherjee, Debaditya; and Whitlock, Gary C., 4,932,028, Cl. 371-16.500.

De Castro, Bruno. Apparatus for lifting tanks. 4,930,750, Cl. 254-89.00H.

Deckenbach, Gottfried: *See*—
Trankle, Gunther; and Deckenbach, Gottfried, 4,931,746, Cl. 330-254.000.

De Cock, Christian: *See*—
Bru-Magniez, Nicole; De Cock, Christian; Poupaert, Jacques; De Keyser, Jean-Luc; and Dumont, Pierre, 4,931,584, Cl. 560-190.000.

Dee Howard Co., The: *See*—
Fage, Etienne, 4,930,308, Cl. 60-262.000.

Deere & Company: *See*—
Benter, Dean W.; and Dowe, James T., 4,930,300, Cl. 56-16.700.
Boe, Thomas E.; Bergene, Mark A.; Kittle, Carl E.; and Sparks, Gregory E., 4,931,967, Cl. 364-571.010.
Buehler, Edgar J.; Draeger, James H.; and Koopmans, Rayment G., 4,930,334, Cl. 72-448.000.
Lauter, Jonathan M., 4,931,001, Cl. 418-113.000.
Love, Mahlon L.; and Leemans, Daniel L., 4,930,590, Cl. 180-55.000.
McBee, Steve H., 4,930,299, Cl. 56-30.000.
Schlueter, Francis E.; and McConnell, Kenneth C., 4,930,297, Cl. 56-16.600.
Shindelar, Aloysius C., 4,930,226, Cl. 33-655.000.
Swartzendruber, James A.; and Dobberpuhl, Dale R., 4,930,593, Cl. 180-89.170.

Deguchi, Hiroyuki: *See*—
Suzuki, Shinichi; Deguchi, Hiroyuki; Hamaoka, Takahiro; and Hibino, Sokichi, 4,930,995, Cl. 417-312.000.

Deguchi, Toshihisa: *See*—
Kojima, Kunio; Sakamoto, Noriaki; Deguchi, Toshihisa; and Yamane, Daiji, 4,932,013, Cl. 369-32.000.

Degussa Aktiengesellschaft: *See*—
Siray, Mustafa; and Kleinschmit, Peter, 4,931,593, Cl. 564-296.000.

DEI Enterprises: *See*—
Hunt, Edwin S., 4,930,924, Cl. 403-24.000.

De Jonge, Adriaan: *See*—
Engel, Wolfhard; Trummlitz, Gunter; Eberlein, Wolfgang; Mihm, Gerhard; Mayer, Norbert; De Jonge, Adriaan; and Rudolf, Klaus, 4,931,436, Cl. 514-220.000.

De Keyser, Jean-Luc: *See*—
Bru-Magniez, Nicole; De Cock, Christian; Poupaert, Jacques; De Keyser, Jean-Luc; and Dumont, Pierre, 4,931,584, Cl. 560-190.000.

Delco Electronics Corporation: *See*—
Marrah, Jeffrey J.; Manlove, Gregory J.; and Kennedy, Richard A., 4,932,058, Cl. 381-13.000.

de Leeuw, Dagobert M.; Zwicker, Walter K.; and Bhargava, Rameshwar N., to North American Philips Corporation. Sol-gel process for producing luminescent thin film, and film so produced and devices utilizing same. 4,931,312, Cl. 427-64.000.

Deley, Serge: *See*—
Fourrey, Francois; Deley, Serge; and Coussemacq, Jean M., 4,930,736, Cl. 248-430.000.

Delignieres, Robert, to Institut Francais du Petrole. Process for signal transmission without electric connection through a conducting wall, the hull of a ship for example, and a device for implementing same. 4,932,006, Cl. 367-134.000.

Dellit, Hans-Joachim: *See*—
Weckherlen, Werner; Dellit, Hans-Joachim; and Gruene, Hans-Georg, 4,930,230, Cl. 34-168.000.

DeLong, Mark L.: *See*—
Parker, Jack H., Jr.; and DeLong, Mark L., 4,930,352, Cl. 73-662.000.

Del Val, Sagrario M.: *See*—
Promtling, Robert A.; Giacobbe, Robert A.; Liesch, Jerrold M.; Del Val, Sagrario M.; Schwartz, Robert E.; and Wichmann, Carol F., 4,931,352, Cl. 435-71.300.

Demand Products, Inc.: *See*—
Hill, Douglas B.; and Newell, Fredrick J., Jr., 4,930,267, Cl. 51-392.000.

Demers, Michael L.: *See*—
Nowak, Michael T.; and Demers, Michael L., 4,931,095, Cl. 106-22.000.

Demizu, Hiromi; Obu, Makoto; Yano, Hidetoshi; Seimiya, Ryubun; and Tarumi, Noriyoshi. Developing device using a single component developer. 4,930,438, Cl. 118-651.000.

den Hollander, Willem, to RCA Licensing Corporation. Rapid access teletext decoder arrangement. 4,931,870, Cl. 358-142.000.

Denis, Jean-Francois: *See*—
Thouron, Rene ; and Denis, Jean-Francois, 4,930,422, Cl. 102-378.000.

Denny Bros. Printing Limited: *See*—
Howard, Robin G., 4,930,812, Cl. 281-5.000.

Department of Electrical Engineering, Science University of Tokyo: *See*—
Sugita, Toshio; Funamoto, Hiroyuki; Furuta, Kazuyoshi; and Koseki, Osamu, 4,931,307, Cl. 427-38.000.

De Peyer, Jacques: *See*—
Baumgarth, Manfred; Gericke, Rolf; Lues, Ingeborg; De Peyer, Jacques; and Bergmann, Rolf, 4,931,454, Cl. 514-254.000.

Deprettere, Edmond F. A.: *See*—
Kroon, Peter; Deprettere, Edmond F. A.; and Sluyter, Robert J., 4,932,061, Cl. 381-30.000.

Derham, James J.; Hannigan, Joseph M.; and Derham, Joseph, to Klenzoid, Inc. Cooling tower system. 4,931,187, Cl. 210-662.000.

Derham, Joseph: *See*—
Derham, James J.; Hannigan, Joseph M.; and Derham, Joseph, 4,931,187, Cl. 210-662.000.

De Rosa, Claudio: *See*—
Corradini, Paolo; De Rosa, Claudio; Guerra, Gaetano; Nicolais, Luigi; Petraccone, Vittorio; and Attalla, Giancarlo, 4,931,325, Cl. 428-35.700.

DeRoseau, Robert F. Combination food container and eating utensil. 4,930,637, Cl. 206-541.000.

Designs by Royo: *See*—
Tichenor, Clyde L.; Royo, Paris E.; and Fleming, Alex W., 4,930,884, Cl. 350-624.000.

Desphandey, Chandra V.: *See*—
Bunshah, Rointan F.; Desphandey, Chandra V.; and Karim, Aziz A., 4,931,158, Cl. 204-192.290.

Dessau, Ralph M.; and Valyocsik, Ernest W., to Mobil Oil Corporation. Thallium or lead-containing microporous crystalline materials and their use as dehydrogenation dehydrocyclization and reforming catalysts. 4,931,416, Cl. 502-74.000.

de Tejada, Inigo S.: *See*—
Goldstein, Irwin; de Tejada, Inigo S.; and Riblet, Leslie A., 4,931,445, Cl. 514-252.000.

Determann, Otto: *See*—
Bleckmann, Hans W.; Fennel, Helmut; Graeber, Johannes; Determann, Otto; and Batistic, Ivica, 4,930,845, Cl. 303-100.000.

Dev, Roger H.; Steinberg, Gabriel; Kam, John B.; and Comer, Stewart A., to Wang Laboratories, Inc. Apparatus for distributing data processing across a plurality of loci of control. 4,932,026, Cl. 370-94.100.

DeVara, Dennis; and Kenny, Andrew A., to Eaton Corporation. Servo-actuator with feedback and method of calibrating. 4,931,710, Cl. 318-663.000.

Devine, George T., to Gilbarco Inc. Liquid dispensing system with electronically controlled valve remote from nozzle. 4,930,665, Cl. 222-28.000.

Dhawan, Balram; Redmore, Derek; and Przybylinski, John L., to Petrolite Corporation. Methods for inhibition of scale in high brine environments. 4,931,189, Cl. 210-700.000.

Dhyanchand, John J.: *See*—
Nguyen, Vietson M.; and Dhyanchand, John J., 4,931,919, Cl. 363-37.000.

Dialogic Corporation: *See*—
Hamilton, Chris A., 4,932,062, Cl. 381-43.000.

Diamant Boart-Stratabit (USA) Inc.: *See*—
Young, David E.; Koskie, Earl T., Jr.; and Easton, Andrew R., 4,930,587, Cl. 175-251.000.

Diamantopoulos, Costas A.; and Alexandrou, Alex P. Device for biostimulation of tissue and method for treatment of tissue. 4,930,504, Cl. 128-395.000.

Diasonics, Inc.: *See*—
Terwilliger, Richard A., 4,930,515, Cl. 128-662.060.

Dickakian, Ghazi B., to Exxon Chemical Patents Inc. Antifoulant additive for light end hydrocarbons. 4,931,164, Cl. 208-48.0AA.

Dickau, Ewald F.; and Breault, John P., to Loctite Corporation. Sealless modular dispenser. 4,930,669, Cl. 222-309.000.

Dickey-John Corporation: *See*—
Bachman, Wesley J., 4,931,774, Cl. 340-603.000.

Dickinson, Barry L., to Amoco Corporation. Polyarylate-polyethylene composite laminated structures. 4,931,364, Cl. 428-412.000.

Dickinson, Ben Wade Oakes, III: *See*—
Turin, Paul S.; Wilkes, Robert D., Jr.; and Hakes, Rowe, 4,930,586, Cl. 175-25.000.

Dickinson, Robert Wayne: *See*—
Turin, Paul S.; Wilkes, Robert D., Jr.; and Hakes, Rowe, 4,930,586, Cl. 175-25.000.

Dickson, James: *See*—
Hackman, Lloyd E.; Dickson, James; Dunlap, David L.; and Handshey, Mark E., 4,930,565, Cl. 164-463.000.

Diehl GmbH & Co.: *See*—
Zwingel, .Dieter; Lochner, Gunther; and Bleickert, Sonke, 4,930,394, Cl. 89-7.000.

Diesel Kiki Co., Ltd.: *See*—
Takekawa, Yoriyuki; and Oshizawa, Hidekazu, 4,930,698, Cl. 236-49.300.

Dietrich, Rainer, to Texas Ignitors Company, Inc. Swirl chamber and spark plug assembly. 4,930,473, Cl. 123-266.000.

Di Giovanni, Patrick: *See*—
Brunet, Michel; Di Giovanni, Patrick; Jouillat, Claude; Lina, Jean-Pierre; and Pennanech'h, Herve , 4,930,999, Cl. 417-552.000.

Digital Equipment Corporation: *See*—
Mallard, William C., Jr., 4,931,791, Cl. 340-825.500.
Mallary, Michael L., 4,931,886, Cl. 360-55.000.

DiGiulio, Peter C.; Bergman, Norman J.; and Salazar, Edilberto I., to Pitney Bowes Inc. Multiple channel servo configuration. 4,931,712, Cl. 318-625.000.

Dillard, Homer E.; VanHoogstrate, John A.; and Muffler, Ronald J., to McDonnell Douglas Corporation. Schlieren color television image aperturing device. 4,931,859, Cl. 358-60.000.

Dimitrijevic, Peter; Skidmore, Mark; and Fishkin, Theodore S., to Hughes Aircraft Company. High speed wide range variable rate power detector. 4,932,075, Cl. 455-226.000.

Dion, John H.: *See*—
Cowger, Bruce; Nielsen, Niels J.; and Dion, John H., 4,931,811, Cl. 346-140.00R.

Dionics Inc.: *See*—
Ehalt, Kenneth; Sheng, William; and Kravitz, Bernard L., 4,931,656, Cl. 250-551.000.

DiPietro, Matthew: *See*—
Baumeister, Hans-Peter; Hickok, William K.; Bernstein, Lawrence J.; DiPietro, Matthew; and Hochreiter, William T., 4,931,883, Cl. 360-11.100.

Director of National Food Research Institute, Minstry of Agriculture, Forestry and Fisheries: *See*—
Kobayashi, Shoichi; Mikuni, Katsuhiko; Monma, Mitsuru; Takano, Toshiya; Hara, Kozo; and Hashimoto, Hitoshi, 4,931,389, Cl. 435-95.000.

Dismukes, John P.; Luton, Michael J.; and Vallone, Joseph, to Exxon Research and Engineering Company. Method for fabricating fracture-resistant diamond and diamond composite articles. 4,931,068, Cl. 51-293.000.

Disser, Robert J.; and Lehnhoff, Richard N., to General Motors Corporation. Impedance matching circuit. 4,931,707, Cl. 318-293.000.

Diversey Corporation: *See*—
Cotter, Terrence; Anderson, Theodore; Gansser, Robert; Kryk, Lewis R.; and Rieple, Theodore R., 4,931,202, Cl. 252-99.000.

Diving Unlimited International, Inc.: *See*—
Long, Richard W.; and Stinton, Robert T., 4,931,335, Cl. 428-57.000.

Dix, Daniel J.: *See*—
Scherf, Timothy P.; Dix, Daniel J.; and Carson, Douglas W., 4,931,917, Cl. 362-371.000.

Dixon International Limited: *See*—
Malcolm-Brown, Tessa, 4,931,339, Cl. 428-71.000.

Djafar, Roger R.: *See*—
Chan, Jimmy H.; and Djafar, Roger R., 4,931,080, Cl. 71-87.000.

Doan, John P. Hay loader. 4,930,964, Cl. 414-24.500.

Dobashi, Yoshitomi; and Yamamoto, Rikio, to Kabushiki Kaisha Toshiba. Discharge lamp. 4,931,685, Cl. 313-15.000.

Dobberpuhl, Dale R.: *See*—
Swartzendruber, James A.; and Dobberpuhl, Dale R., 4,930,593, Cl. 180-89.170.

Dobbers, Jurgen; Reizlein, Karl; and Bredtmann, Kurt, to Bayer Aktiengesellschaft. Self-levelling mortar mixture. 4,931,099, Cl. 106-775.000.

Dr. Ing. h.c.F. Porsche AG: *See*—
Kamprath, Axel; and Weyandt, Johannes, 4,930,469, Cl. 123-195.00C.

Dr. Karl Thomae GmbH: *See*—
Engel, Wolfhard; Trummlitz, Gunter; Eberlein, Wolfgang; Mihm, Gerhard; Mayer, Norbert; De Jonge, Adriaan; and Rudolf, Klaus, 4,931,436, Cl. 514-220.000.

Doehler, Joachim; Dotter, Buddie, II; Krisko, Jeffrey M.; and Peedin, Lester R., to Energy Conversion Devices, Inc. High power microwave transmissive window assembly. 4,931,756, Cl. 333-252.000.

Doerge, Liesel: *See*—
Friebe, Walter-Gunar; Reinholz, Erhard; Doerge, Liesel; and Stegmeier, Karlheinz, 4,931,462, Cl. 514-419.000.

Doherty, Roger D.; Singh, Rishi P.; and Slaney, John S., to SPS Technologies, Inc. Nickel-cobalt based alloys. 4,931,255, Cl. 420-586.000.

DOM-Sicherheitstechnik GmbH & Co. KG: *See*—
Braun, Peter B., 4,931,600, Cl. 200-43.080.

Domain, Inc.: *See*—
Rebhan, Herbert J., 4,931,290, Cl. 424-692.000.

Domay, Theodor: *See*—
Monson, Clifford L.; Perry, Danny C.; Domay, Theodor; and Wilks, Henry A., 4,930,178, Cl. 15-320.000.

Donlan, John P.: *See*—
North, William E.; Entenmann, David T.; and Donlan, John P., 4,930,980, Cl. 415-115.000.

Donnell, Richard T.: *See*—
LaMont, David G.; LaMont, Madeline A.; and Donnell, Richard T., 4,931,780, Cl. 340-691.000.

Donnelly Corporation: *See*—
Schofield, Kenneth; Gallmeyer, William W.; and Zwiep, Theodore C., 4,930,742, Cl. 248-475.100.

Dorcsi, Geza: *See*—
Barlai, Zoltan; Dorcsi, Geza; Rez, Ferenc; and Vamos, Attila, 4,931,736, Cl. 324-367.000.

Doring, Volker: *See*—
Pakull, Ralf; Eckhardt, Volker; Genz, Joachim; Idel, Karsten; Kricheldorf, Hans-Rytger; and Doring, Volker, 4,931,534, Cl. 528-193.000.

Doryokuro Kakunenryo Kaihatsu Jigyodan: *See*—
Otsuka, Katsuyuki; Takahashi, Yoshiharu; and Tamai, Hideaki, 4,931,153, Cl. 204-39.000.

Dosen, Todd G.: *See*—
Janezich, Robert J.; Cedar, Charles E.; and Dosen, Todd G., 4,930,568, Cl. 165-76.000.

Doshier, John R. Heat pipe and aqua-thaw animal waterer. 4,930,572, Cl. 165-45.000.

Doskocil Manufacturing Co., Inc.: *See*—
Sharp, Douglas J.; and Smith, E. W., 4,930,819, Cl. 292-42.000.

Dosmann, Andres J., to Miles Inc. Optical transmission spectrometer. 4,930,865, Cl. 350-169.000.

Dotter, Buddie, II: *See*—
Doehler, Joachim; Dotter, Buddie, II; Krisko, Jeffrey M.; and Peedin, Lester R., 4,931,756, Cl. 333-252.000.

Dovidauskas, John J. Boat trailer supporting device. 4,930,967, Cl. 414-373.000.

Dow Chemical Company, The: *See*—
Cisar, Alan J.; and Brooks, Calvin F., 4,931,092, Cl. 75-244.000.
Malhotra, Sudarshan K.; Dripps, James E.; Bradfisch, Gregory A.; Wollowitz, Susan; and Knox, Ingrid L., 4,931,452, Cl. 514-344.000.
Myers, Michael O., 4,931,486, Cl. 521-159.000.
Priester, Ralph D., Jr.; Strojny, Edwin J.; and Stutts, Debra H., 4,931,487, Cl. 521-163.000.
Raspor, Otto C.; and Pawloski, James C., 4,931,121, Cl. 156-213.000.
Volkmann, Curtis L.; Kester, John J.; and Stevens, Gregory A., 4,931,125, Cl. 156-272.800.

Dowa Mining Co., Ltd.: *See*—
Sonta, Hiromi; and Shiratori, Toshikazu, 4,931,262, Cl. 423-220.000.

Dowd, James P.; Boyer, Charles C.; and Gardner, Gary W., to Duochem, Inc. Distributive anode coating. 4,931,156, Cl. 204-147.000.

Dowe, James T.: *See*—
Benter, Dean W.; and Dowe, James T., 4,930,300, Cl. 56-16.700.

Dozieres, Richard: *See*—
Blanchard, Gilbert; Garreau, Francois; Prigent, Michel; and Dozieres, Richard, 4,931,419, Cl. 502-304.000.

Draeger, James H.: *See*—
Buehler, Edgar J.; Draeger, James H.; and Koopmans, Rayment G., 4,930,334, Cl. 72-448.000.

Drake, Craig D.; and Ting, Phillip, to Ring King Visibles. Computer support device with power control devices. 4,931,978, Cl. 364-708.000.

Dranez Anstalt: *See*—
Hayek, Zamir, 4,930,498, Cl. 128-30.200.

Dresser Industries, Inc.: *See*—
Latty, James A.; and Eisenbarth, Spencer, 4,930,454, Cl. 122-4.00D.

DRI Mark Products, Inc.: *See*—
Reichmann, Charles; and Kalsi, Bhupinder S., 4,930,923, Cl. 401-278.000.

Dripps, James E.: *See*—
Malhotra, Sudarshan K.; Dripps, James E.; Bradfisch, Gregory A.; Wollowitz, Susan; and Knox, Ingrid L., 4,931,452, Cl. 514-344.000.

Dror, Jacob: *See*—
Croitoriu, Natan; Dror, Jacob; Goldenberg, Ephraim; Mendelovic, David; and Israel, Ganot, 4,930,863, Cl. 350-96.320.

Druschke, Wolfgang: *See*—
Aschter, Gerhard; Schwerzel, Thomas; Osterloh, Rolf; Neubert, Gerhard; Pfoehler, Peter; Druschke, Wolfgang; and Jaeger, Helmut, 4,931,494, Cl. 524-460.000.

Duan, Daniel C.: *See*—
Asmus, Robert A.; and Duan, Daniel C., 4,931,282, Cl. 424-448.000.

Dube, Ghyslain: *See*—
Waite, Peter D.; and Dube, Ghyslain, 4,931,091, Cl. 75-680.000.

Dubois, Eugene, to Bass Pro Shops, Inc. Fishing lure spinner blade with rattle chamber. 4,930,247, Cl. 43-42.310.

Duerring, Anthony A., to Sandvik Special Metals Corp. Method and apparatus for reloading a pilgering mill. 4,930,328, Cl. 72-208.000.

Dugan, Jeffrey S.: *See*—
Tolbert, Thomas W.; Dugan, Jeffrey S.; Cauthen, John V.; and Hendrix, James E., 4,931,342, Cl. 428-90.000.

Duhamel, Maurice: *See*—
Belleride, Paul; and Duhamel, Maurice, 4,931,612, Cl. 219-60.00R.

Dukart, Blaine R.: *See*—
Dukart, Richard L.; and Dukart, Blaine R., 4,931,332, Cl. 428-50.000.

Dukart, Richard L.; and Dukart, Blaine R. Non-warping and torque resistant structural panel for paneling, furniture and flooring. 4,931,332, Cl. 428-50.000.

Dumas, Maurice R. Tamper-proof binder for photographs and the like. 4,930,927, Cl. 402-63.000.

Dumont, Pierre: *See*—
Bru-Magniez, Nicole; De Cock, Christian; Poupaert, Jacques; De Keyser, Jean-Luc; and Dumont, Pierre, 4,931,584, Cl. 560-190.000.

Dunlap, David L.: *See*—
Hackman, Lloyd E.; Dickson, James; Dunlap, David L.; and Handshey, Mark E., 4,930,565, Cl. 164-463.000.

Dunn, John B. R.; McDaniel, Lowell R.; Shelley, Patrick W.; and Lewey, Karen M., to Hewlett-Packard Company. Flow control system for ink cartridges. 4,931,812, Cl. 346-140.00A.

Dunn, Vernon E.: *See*—
Nelson, William W.; Lesko, Camille A.; Kennedy, Andrew M., II; and Dunn, Vernon E., 4,931,753, Cl. 333-161.000.

Dunnion, Dermot: *See*—
Asghar, Safdar M.; Pyi, Hwa-Sheng; and Dunnion, Dermot, 4,931,973, Cl. 364-724.160.

Duochem, Inc.: *See*—
Dowd, James P.; Boyer, Charles C.; and Gardner, Gary W., 4,931,156, Cl. 204-147.000.

Dupeuble, Paul: *See*—
Charlier, Jacques; Dupeuble, Paul; and Gessay, Jean-Claude, 4,930,940, Cl. 405-267.000.

Duphar International Research B.V.: *See*—
Bijl, Hugo; and Vroklage, Sebastiaan J. W., 4,931,554, Cl. 536-124.000.

Du Pont de Nemours, E. I., and Company: *See*—
Atwater, Charles B., 4,931,103, Cl. 134-2.000.
Berrigan, Paul J.; and Brennan, Michael J., Jr., 4,931,721, Cl. 324-658.000.
Hayes, Richard A., 4,931,539, Cl. 528-353.000.
Jackson, Scott C., 4,931,782, Cl. 340-706.000.
Kobos, Robert K.; and Pelosi, Lorenzo F., 4,931,172, Cl. 204-418.000.
Moussie, Bob, 4,931,754, Cl. 333-184.000.
Wolf, Anthony D., 4,931,081, Cl. 71-92.000.

Durham, Dana: *See*—
Spak, Mark A.; Mammato, Donald; Durham, Dana; and Jain, Sangya, 4,931,381, Cl. 430-325.000.

Dutcher, John S.; Sharifian, Hossein; and Tanner, Alan R., to Southwestern Analytical Chemicals, Inc. Electrolytic reductive coupling of quaternary ammonium compounds. 4,931,155, Cl. 204-72.000.

Dutrisac, Aurele L.: *See*—
Hayward, Alan G.; Gregg, Lauri C.; Dutrisac, Aurele L.; and Joliat, Jack J., 4,930,595, Cl. 181-104.000.

Dutt, Herbert V.; and Lewis, Duane H., to Continental Plastics, Inc. Tamper indicating closure system utilizing axially extending ratchet. 4,930,647, Cl. 215-252.000.

Dutzmann, Stefan: *See*—
Fest, Christa; Brandes, Wilhelm; Dutzmann, Stefan; Hanssler, Gerd; and Kuck, Karl-Heinz, 4,931,465, Cl. 514-477.000.

DuVall, Larry A.: *See*—
Wilkinson, Kerry E.; and DuVall, Larry A., 4,930,842, Cl. 297-466.000.

Dynamics Corporation of America: *See*—
Bawa, Harinder S.; and Abbey, Christopher P., 4,930,276, Cl. 52-211.000.

E.G.O. Elektro-Gerate Blanc u. Fischer: *See*—
Goessler, Gerhard, 4,931,621, Cl. 219-467.000.
Kicherer, Robert; and Schreder, Felix, 4,931,620, Cl. 219-463.000.

E. R. Squibb & Sons, Inc.: *See*—
Grover, Gary J.; and Fulmor, Irvin E., III, 4,931,460, Cl. 514-381.000.
Grover, Gary J.; and Bergey, James L., 4,931,464, Cl. 514-423.000.
Keyes, Denis E.; and Aronoff, Marvin S., 4,930,942, Cl. 406-49.000.
Steer, Peter L., 4,931,045, Cl. 604-338.000.
Sudilovsky, Abraham; and Horovitz, Zola P., 4,931,430, Cl. 514-19.000.

Earl, Paul M.: *See*—
Ungchusri, Tep; and Earl, Paul M., 4,930,791, Cl. 277-151.000.

Easterbrook, James E., to Rank Cintel Limited. Computer graphics. 4,931,784, Cl. 340-728.000.

Eastman Kodak Company: *See*—
Atkinson, William C.; and Fields, Roger A., 4,931,819, Cl. 354-275.000.
Baumeister, Hans-Peter; Hickok, William K.; Bernstein, Lawrence J.; DiPietro, Matthew; and Hochreiter, William T., 4,931,883, Cl. 360-11.100.
Gates, Richard A., 4,931,818, Cl. 354-222.000.
Higgins, Joanne M.; and Mosehauer, Michael, 4,931,835, Cl. 355-203.000.
Lavender, William J., 4,931,601, Cl. 200-83.00N.
Mahoney, Gregory P., 4,931,842, Cl. 355-317.000.
Matsui, Nobuhito; and Mita, Kikuo, 4,931,881, Cl. 358-466.000.
McColgin, William C.; Brust, Thomas B.; Daly, Robert C.; Jech, Joseph, Jr.; and Lindholm, Robert D., 4,931,351, Cl. 430-323.000.
Quenin, John A.; and Porte, Johannes J., 4,931,257, Cl. 422-100.000.
Russel, Steven M.; McGlen, James A.; and Anderson, Erik V., 4,930,765, Cl. 271-214.000.

Smart, David C., 4,930,712, Cl. 242-74.000.
Spada, Frederick E., 4,931,892, Cl. 360-113.000.
Easton, Andrew R.: *See*—
Young, David E.; Koskie, Earl T., Jr.; and Easton, Andrew R., 4,930,587, Cl. 175-251.000.
Easy Industries Co., Ltd.: *See*—
Chaur Ching, Lai; and Wen Ho, Huang, 4,930,584, Cl. 173-116.000.
Eaton, Cheryl A.: *See*—
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Burke, John M., 4,931,102, Cl. 134-2.000.
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Creed, Brian T.; and Bradshaw, Cyril E., 4,930,455, Cl. 123-41.100.
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Reinicke, Robert H.; and Yang, Jefferson Y. S., 4,930,746, Cl. 251-129.110.
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Priesnitz, Alfred, 4,930,957, Cl. 409-234.000.
Eberlein, Wolfgang: *See*—
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Reiser, Peter; and Kenner, Erich, 4,931,011, Cl. 431-3.000.
ECIA - Equipements et Composants pour l'Industrie Automobile: *See*—
Foarrey, Francois; Delcy, Serge; and Coussemacq, Jean M., 4,930,736, Cl. 248-430.000.
Eckert, Guenter: *See*—
Bay, Herbert; Eckert, Guenter; and Bergold, Wolfram, 4,931,062, Cl. 8-94.230.
Eckert, Robert L.; Atkins, Don C.; and Sechler, Lee. Hazardous liquid containment tray. 4,930,632, Cl. 206-386.000.
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Boyer, Brett D.; and Eckrich, Thomas M., 4,931,556, Cl. 540-364.000.
Brennan, John; and Eckrich, Thomas M., 4,931,557, Cl. 540-364.000.
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Edge Enterprises, Inc.: *See*—
Castello, Gregory L., 4,931,051, Cl. 604-361.000.
Edgren, David E.; and Theeuwes, Felix, to ALZA Corporation. Aqueous based pharmaceutical coating composition for dosage forms. 4,931,285, Cl. 424-473.000.
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Potter, Arthur C.; and Eeles, Deborah J. M., 4,930,759, Cl. 269-54.500.
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Horrobin, David F., 4,931,468, Cl. 514-560.000.
Effland, Richard C.; Klein, Joseph T.; Olsen, Gordon E.; and Davis, Larry, to Hoechst-Roussel Pharmaceuticals Inc. Naphthylamino-and naphthyloxy-pyridinamine comounds useful as topical antiinflammatory agents for the treatment of skin disorders. 4,931,457, Cl. 514-349.000.
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Kornecki, Elizabeth H.; and Ehrlich, Yigal H., 4,931,002, Cl. 424-529.000.
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Eichenberger, William A., to Apco Power-Unit Corporation. Apparatus for counterbalancing an overhead door. 4,930,182, Cl. 16-198.000.
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Latty, James A.; and Eisenbarth, Spencer, 4,930,454, Cl. 122-4.00D.
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Torstensson, Lars-Gunnar; Dahlqvist, Per-Arne; and Benjelloun, Malika, 4,931,292, Cl. 426-2.000.
Ekerot, Sven; and Svennebrink, Jan, to Ekerot, Sven. Method for heating ceramic material, primarily in conjunction with the use of such material in metallurgical processes, and an arrangement for carrying out the method. 4,930,755, Cl. 266-44.000.
Ekman, Bo M.; Larsson, Kare V.; Lindahl, Ake R.; and Rothman, Ulf S. E., to Biogram AB. Micro-capsules. 4,931,284, Cl. 424-450.000.
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Boucher, Val G.; Phelps, Weldon L.; and Ekstrand, Daniel R., 4,930,366, Cl. 74-365.000.
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Isle, Brian A.; Bloom, Charles P.; Butler, Arch W.; and Spoor, David, 4,931,950, Cl. 364-513.000.
Electro Scientific Industries, Inc.: *See*—
Johnson, Joel C.; and Harris, Richard S., 4,930,901, Cl. 372-26.000.
Elektro-Apparatebau Olten AG: *See*—
Berger, Fritz, 4,931,607, Cl. 200-524.000.
Eli Lilly and Company: *See*—
Barnett, Charles J., 4,931,558, Cl. 544-124.000.
Beck, James R.; and Mann, Richard K., 4,931,083, Cl. 71-92.000.
Boyer, Brett D.; and Eckrich, Thomas M., 4,931,556, Cl. 540-364.000.
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Holland, Donald R.; and Robertson, David W., 4,931,470, Cl. 514-619.000.
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Danielsen, Tore; and Herfurth, Eike, 4,931,098, Cl. 106-638.000.
Elliott, Charles T.; and Charlton, David E., to Philips Electronic and Associated Industries Ltd. Thermal radiation imaging devices and systems. 4,931,648, Cl. 250-370.100.
Elliott, Raymond, to Imperial Chemical Industries PLC. Triazole derivatives useful as plant growth regulating agents. 4,931,082, Cl. 71-92.000.
Ellis, Preston L.: *See*—
Castonguay, Roger N.; Klein, Keith W.; Arnold, David; and Ellis, Preston L., 4,931,603, Cl. 200-144.00R.
Ellison, Garry L., to Root-Lowell Manufacturing Company. Self-pressurizing sprayer. 4,930,664, Cl. 222-1.000.
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Elopak Systems AG: *See*—
Lisiecki, Robert E., 4,931,031, Cl. 493-355.000.
Eltec Instruments, Inc.: *See*—
Kuster, Walter; and Keller, Hans J., 4,930,864, Cl. 350-167.000.
Elwing, Ben, to Persson, Johnny. Automatic process line. 4,931,833, Cl. 355-85.000.
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Ema, Takehiro: *See*—
Honda, Michitaka; and Ema, Takehiro, 4,931,954, Cl. 364-518.000.
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Mayo, William T.; and Embree, Paul M., 4,930,513, Cl. 128-661.090.
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Lewis, John G., 4,931,682, Cl. 310-89.000.
Emhart Industries, Inc.: *See*—
Baker, Russ J.; and Hansen, Robert A., 4,930,364, Cl. 73-865.800.
Emmons, Lawrence D.; Mackley, James S.; Stokes, David H.; Stefenel, Rudolph S.; Brisko, William E., Jr.; and Cooper-Hart, Michael A., to Luma Telecom, Inc. Conversational video phone. 4,932,047, Cl. 379-53.000.
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Lilie, Dietmar E. B., 4,930,405, Cl. 92-128.000.
Emslander, Jeffrey O., to Minnesota Mining and Manufacturing Company. Capliner/innerseal composite utilizing cold seal adhesive. 4,930,646, Cl. 215-232.000.
Emu-Eau Industrial Co., Ltd.: *See*—
Ando, Takaharu, 4,930,793, Cl. 279-61.000.
Endo, Hozumi: *See*—
Hosoi, Hisataka; Endo, Hozumi; Ando, Tatsuo; and Shoji, Mamoru, 4,931,239, Cl. 264-63.000.
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Goh, Atsushi; Endo, Keiji; and Yamamoto, Yuri, 4,931,088, Cl. 71-100.000.
Endo, Kenzo: *See*—
Hara, Yasuhiko; and Endo, Kenzo, 4,930,890, Cl. 356-241.000.
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Kawakami, Tamaki; Endo, Masayasu; and Katsumata, Toshiyuki, 4,931,912, Cl. 362-61.000.
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Tanzawa, Misao; and Endo, Shuichi, 4,931,840, Cl. 355-298.000.
EndoTherapeutics: *See*—
Holmes, William A.; and Costa, Peter F., 4,931,042, Cl. 604-164.000.
Energy Conversion Devices, Inc.: *See*—
Doehler, Joachim; Dotter, Buddie, II; Krisko, Jeffrey M.; and Peedin, Lester R., 4,931,756, Cl. 333-252.000.

Engel, Wolfhard; Trummlitz, Gunter; Eberlein, Wolfgang; Mihm, Gerhard; Mayer, Norbert; De Jonge, Adriaan; and Rudolf, Klaus, to Dr. Karl Thomae GmbH. Condensed diazepinones, processes for preparing them and pharmaceutical compositions containing these compounds. 4,931,436, Cl. 514-220.000.

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Werth, John; and Fekete, Imre, deceased, 4,931,947, Cl. 364-492.000.

Engelhardt, Friedrich; and Riegel, Ullrich, to Cassella Aktiengesellschaft. Hydrophilic swellable graft polymers from maleic anhydride-alkylene substrate. 4,931,497, Cl. 525-42.000.

Eagle, Norman, to United States Shoe Corporation, The. Multilayer shoe sole. 4,930,232, Cl. 36-44.000.

Enomoto, Kanehiko; Ryuno, Koitchiro; and Shimizu, Hitoshi, to Mitsubishi Rayon Kabushiki Kaisha; and Nitto Kagaku Kogyo Kabushiki Kaisha. Method for preservation of nitrile hydration activity. 4,931,391, Cl. 435-188.000.

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Ensuiko Sugar Regining Co., Ltd.: *See*—
Kobayashi, Shoichi; Mikuni, Katsuhiko; Monma, Mitsuru; Takano, Toshiya; Hara, Kozo; and Hashimoto, Hitoshi, 4,931,389, Cl. 435-95.000.

Entenmann, David T.: *See*—
North, William E.; Entenmann, David T.; and Donlan, John P., 4,930,980, Cl. 415-115.000.

Entreprenadaktiebolaget E. & G. Jonsson: *See*—
Winkle, Sigvard; and Persson, Henrik, 4,930,542, Cl. 138-98.000.

Environmental Research Institute of Michigan: *See*—
Cederquist, John N., 4,930,847, Cl. 350-3.600.
Mohan, Paul, 4,931,021, Cl. 439-285.000.

Envirotech Corporation: *See*—
Laros, Timothy J., 4,931,190, Cl. 210-710.000.

Enwiller, Vernon L. Apparatus for retrieving lodged fishing lures. 4,930,244, Cl. 43-17.200.

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Keller, Glenn J.; and Solis, Javier A., 4,931,751, Cl. 332-108.000.

Equitable Bag Co., Inc.: *See*—
Leeds, Dennis, 4,931,033, Cl. 493-195.000.

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Mueller, Werner H.; Khanna, Dinesh N.; Vora, Rohitkumar H.; and Erckel, Ruediger J., 4,931,540, Cl. 528-353.000.

Erdag, Eren: *See*—
Reifel, Harry C.; Erdag, Eren; and Soerewyn, Herman V. D., 4,931,906, Cl. 361-386.000.

Erett, Richard E.: *See*—
Chou, Wayne W.; and Erett, Richard E., 4,932,054, Cl. 380-4.000.

Erner, William E., to Biomed Technology, Inc. Fluorinated triethylenediamine as an oxygen transport agent. 4,931,472, Cl. 514-661.000.

Ernst Leitz Wetzlar GmbH: *See*—
Koch, Herbert; and Weimar, Peter, 4,930,882, Cl. 350-530.000.

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Hundt, Gary W., 4,930,648, Cl. 220-1.00B.

Essig, Richard C.: *See*—
Bruce, Douglas A.; and Essig, Richard C., 4,930,835, Cl. 296-102.000.

Estep, William E. Drain standpipe. 4,930,552, Cl. 137-362.000.

ETA SA Fabriques d'Ebauches: *See*—
Willemin, Albert, 4,931,248, Cl. 264-266.000.

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Rault, Jean-Christophe, 4,931,980, Cl. 364-750.500.

Etefin S.p.A.: *See*—
Bonicioli, Paolo; Carminati, Gianbattista; and Buonfigliuoli, Giorgio, 4,932,024, Cl. 370-85.900.

Ethyl Corporation: *See*—
Laurenzo, Kathleen S., 4,931,596, Cl. 564-477.000.

Eta A. Colly: *See*—
Corsini, Florent, 4,930,339, Cl. 72-482.000.

European Computer-Industry Research Centre GmbH: *See*—
Syre, Jean-Claude; Westphal, Harald; and Hailperin, Max, 4,931,931, Cl. 364-300.000.

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Evans, Anthony C., to Kelsey-Hayes Company. Calibration bracket for vehicle height sensor. 4,930,340, Cl. 73-1.00I.

Evans, Anthony C.: *See*—
Sporzynski, Robert S.; Evans, Asthony C.; and Robinette, Richard T., 4,930,606, Cl. 188-218.0XL.

Evans, John V.: *See*—
Assal, Francois T.; Evans, John V.; Mahle, Christoph E.; Zaghloul, Amir I.; and Gupta, Ramesh K., 4,931,802, Cl. 342-356.000.

Eveready Battery Company: *See*—
Ayers, Alan D.; and Wesner, John A., 4,931,368, Cl. 429-53.000.

Exfluor Research Corporation: *See*—
Bierschenk, Thomas R.; Juhlke, Timothy J.; Lagow, Richard J.; and Kawa, Hajimu, 4,931,199, Cl. 252-68.000.

Explosafe North America Inc.: *See*—
Szego, Andrew, 4,930,651, Cl. 220-88.00A.

Exxon Chemical Patents Inc.: *See*—
Dickakian, Ghazi B., 4,931,164, Cl. 208-48.0AA.
Saleh, Ramzi Y.; and Wachs, Israel E., 4,931,572, Cl. 549-239.000.

Exxon Production Research Company: *See*—
Rawstron, Philip J. M.; and D'Abrera, Francis, 4,930,938, Cl. 405-204.000.
Winbow, Graham A.; Chen, Sen-Tsuen; and Rice, James A., 4,932,003, Cl. 367-75.000.

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Dismukes, John P.; Luton, Michael J.; and Vallone, Joseph, 4,931,068, Cl. 51-293.000.
Vaughan, David E. W.; and Strohmaier, Karl G., 4,931,267, Cl. 423-328.000.

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Zsifkovits, Wilhelm; Gruning, Burghard; Kollmeier, Hans-Joachim; Schaefer, Dietmar; and Weitemeyer, Christian, 4,931,362, Cl. 428-402.220.

Faber, Wolfgang: *See*—
Wolfrum, Erhard; Faber, Wolfgang; Konig, Reiner; and Sieglen, Rolf A., 4,930,359, Cl. 73-863.230.

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Arona-Deloneghi, Adriano G., 4,930,688, Cl. 222-484.000.

Faeser, Ulrich, to Fresenius AG. Infusion syringe pump. 4,931,041, Cl. 604-155.000.

Fage, Etienne, to Dee Howard Co., The. Double-flow turboshaft engine with variable confluent nozzle. 4,930,308, Cl. 60-262.000.

Faircloth, George E.: *See*—
Bafford, Richard A.; Faircloth, George E.; and Lee, Haeuh C., 4,931,495, Cl. 524-460.000.

Falco, Gene A. Masonry anchor. 4,930,284, Cl. 52-704.000.

Falconbridge Limited: *See*—
Hayward, Alan G.; Gregg, Lauri C.; Dutrisac, Aurele L.; and Joliat, Jack J., 4,930,593, Cl. 181-104.000.

Falk, David O., to Marathon Oil Company. Method of protecting a permeable formation. 4,930,575, Cl. 166-295.000.

Fanuc Ltd.: *See*—
Ikeda, Yoshiaki; and Mitsuru, Kuwasawa, 4,931,709, Cl. 318-567.000.
Toyoda, Kenichi; Torii, Nobutoshi; Mizuno, Hitoshi; and Miyawaki, Masanao, 4,931,617, Cl. 219-125.100.

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Naruo, Hatsumi, 4,931,711, Cl. 318-568.130.

Farber, Bruce W.: *See*—
Sines, Randy D.; and Farber, Bruce W., 4,930,782, Cl. 273-73.00D.

Farber, Jurgen, to PKL Verpackungssysteme GmbH. Parallelepipedal flat gabled package and method of manufacture. 4,930,683, Cl. 229-125.090.

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Farnbauer-Schmidt, Konrad: *See*—
Haag, Ernst; Haag, Gunter; Leitner, Georg; and Farnbauer-Schmidt, Konrad, 4,931,794, Cl. 341-31.000.

Farrington, Allan P.: *See*—
Marshall, Gerald M.; and Farrington, Allan P., 4,931,357, Cl. 428-284.000.

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Jovanovic, Milan; Farrington, Richard; and Lee, Fred C., 4,931,716, Cl. 323-285.000.

Fatemi, Homi: *See*—
Brown, Candice H.; and Fatemi, Homi, 4,931,852, Cl. 357-72.000.

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Song, Suk-Zu; Mehta, Surendra C.; Murthy, Kuchi S.; Nesbitt, Russell U.; and Fawzi, Mahdi B., 4,931,519, Cl. 526-258.000.

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Herbst, Donald J.; Fay, Richard D.; Frericks, David L.; and Blair, Bruce A., 4,931,018, Cl. 434-234.000.

Feder, David: *See*—
Fitzig, Simon; and Feder, David, 4,930,920, Cl. 401-176.000.

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Brecht, William B.; Feder, David O.; McAndrews, Joseph M.; and Williamson, Allan J., 4,931,367, Cl. 429-50.000.

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Feichtmeir, Raymond A.; Cothrell, LeRoy E.; Moon, Jack E.; and Turner, Ted R., to Tecton Laminates Corp. Veneer edge joinder method and apparatus. 4,931,113, Cl. 156-64.000.

Feinauer, Roland: *See*—
Jadamus, Hans; Ribbing, Wilfried; and Feinauer, Roland, 4,931,504, Cl. 525-68.000.

Fekete, Anna M., administratrix: *See*—
Werth, John; and Fekete, Imre, deceased, 4,931,947, Cl. 364-492.000.

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Wegener, Peter; Feldhues, Michael; and Litterer, Heinz, 4,931,568, Cl. 549-6.000.

Feldman, Ruth L. Diaper with integral wiping cloth and disposal container. 4,931,052, Cl. 604-385.100.

Fennel, Helmut: *See*—
Bleckmann, Hans W.; Fennel, Helmut; Graeber, Johannes; Determann, Otto; and Batistic, Ivica, 4,930,845, Cl. 303-100.000.

Ferco International: *See*—
Kautt, Jean-Jacques, 4,930,212, Cl. 29-788.000.

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Owens, Robert A.; Chin, Roland L.; Ferguson, Susan A.; and Lewis, James M., 4,931,380, Cl. 430-296.000.

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Gaffar, Abdul; Polefka, Thomas G.; Ferlauto, Robert J., Jr.; and Crisafulli, Rosemarie M., 4,931,273, Cl. 424-52.000.

Ferlise, Victor J. Swimming pool with convertible hot tub. 4,930,168, Cl. 4-489.000.

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McNaught, William G.; and Hill, Roger, 4,930,676, Cl. 228-115.000.

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Ferrato, Joseph P.; and Ferrato, Julie C., 4,931,209, Cl. 252-299.630.

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Neudeck, George W.; and Rieth, Paul H., 4,931,415, Cl. 501-133.000.

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Handke, Gunther, 4,930,803, Cl. 280-668.000.

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Naik, Subhash K.; and Fiedler, Louis J., 4,931,152, Cl. 204-38.500.

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Atkinson, William C.; and Fields, Roger A., 4,931,819, Cl. 354-275.000.

Fierro, Joseph, to Heinemann Electric Company. Circuit breaker construction. 4,931,762, Cl. 337-66.000.

Figgie International, Inc.: *See*—
Barnett, Charles B.; and Rabinovich, Leonid, 4,930,578, Cl. 169-39.000.

Fikentscher, Rolf: *See*—
Baumgarte, Ulrich; Fikentscher, Rolf; Heimann, Sigisenund; Mertens, Heinrich; Schneider, Siegfried; and Vescia, Michele, 4,931,065, Cl. 8-188.000.

Finch, Harry E.; and Szayer, Geza J. Modular security door system. 4,930,563, Cl. 160-271.000.

Findeisen, Kurt; Lindig, Markus; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, to Bayer Aktiengesellschaft. Herbicidal substituted triazolinones. 4,931,084, Cl. 71-92.000.

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Sabatka, Winston E., 4,931,109, Cl. 148-249.000.

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Katz, Ronald A.; and Ross, Dennis L., 4,932,046, Cl. 379-32.000.

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Fischer, Mark C.: *See*—
Olivenbaum, James E.; and Fischer, Mark C., 4,931,976, Cl. 364-571.040.

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Fischer, Rolf: *See*—
Kummer, Rudolf; Merger, Franz; Bertleff, Werner; and Fischer, Rolf, 4,931,590, Cl. 562-590.000.

Fischer, Siegmar: *See*—
Meffert, Wolfgang; Silligmann, Kalr-Heinz; Fischer, Siegmar; and Hahn, Ulf, 4,930,420, Cl. 102-374.000.

Fischer, Steven P. Enclosed drum collet storage system. 4,930,953, Cl. 409-134.000.

Fisher, Frank B.; and Langdon, Paul J., to Cummins Engine Company, Inc. Compressors. 4,930,979, Cl. 415-58.400.

Fisher, John H.: *See*—
Layton, Derek G.; Smith, Alan M.; Fisher, John H.; Pettigrew, Robert M.; and Petty-Saphon, Satham, 4,931,384, Cl. 435-7.000.

Fisher, Roger K., to Antenna Company, The. Adhesive system and method for mounting a cellular telephone antenna. 4,931,805, Cl. 343-715.000.

Fishkin, Theodore S.: *See*—
Dimitrijevic, Peter; Skidmore, Mark; and Fishkin, Theodore S., 4,932,075, Cl. 455-226.000.

Fitch, Jonathan; and Hochsprung, Ronald, to Apple Computer, Inc. Computer system for automatically reconfigurating memory space to avoid overlaps of memory reserved for expansion slots. 4,931,923, Cl. 364-200.000.

Fitzig, Simon; and Feder, David, to Raniot University Authority of Applied Research & Industrial Development Ltd. Combined material applicator and gingival tissue retractor for making dental impressions. 4,930,920, Cl. 401-176.000.

Fiziko-Tekhnicheskiy Institut Imeni A.F. Ioffe an SSSR: *See*—
Voronin, Alexandr V.; Kuznetsov, Vladimir M.; Peregud, Boris P.; and Rusakov, Alexandr I., 4,931,702, Cl. 315-344.000.

Flamig, Hans: *See*—
Steiner, Karl; Mullner, Josef; Schiel, Christian; and Flamig, Hans, 4,931,142, Cl. 162-358.000.

Fleck Aerospace Limited Partnership: *See*—
Hartman, Neil W., 4,930,309, Cl. 60-267.000.

Fleenor, J. Jerome; Chance, Christopher N.; and Mittes, Robert T., to Philip Morris Incorporated. Instrument for measuring package seals. 4,930,344, Cl. 73-49.300.

Fleischer Manufacturing, Inc.: *See*—
Fleischer, Mathew W.; and David, John C., 4,930,581, Cl. 172-6.000.

Fleischer, Mathew W.; and David, John C., to Fleischer Manufacturing, Inc. Guidance control apparatus for agricultural implement. 4,930,581, Cl. 172-6.000.

Fleming, Alex W.: *See*—
Tichenor, Clyde L.; Royo, Paris E.; and Fleming, Alex W., 4,930,884, Cl. 350-624.000.

Fleming, Maurice J.: *See*—
Calhoun, Clyde D.; Foss, George D.; Fleming, Maurice J.; and Bruxvoort, Wesley J., 4,930,266, Cl. 51-293.000.

Fleming, William T., Jr., to Gilian Instrument Corp. Double acting diaphragm air pump. 4,931,000, Cl. 417-534.000.

Flex Products, Inc.: *See*—
Berning, Peter H.; and Phillips, Roger W., 4,930,866, Cl. 350-320.000.

Flood, Gary M.: *See*—
Slutz, David E.; Gigl, Paul D.; Flood, Gary M.; and Smith, Gary W., 4,931,363, Cl. 428-408.000.

Florez, Leigh T.: *See*—
Aspnes, David E.; Bhat, Rajaram; Colas, Etienne G.; Florez, Leigh T.; Harbison, James P.; and Studna, Amabrose A., 4,931,132, Cl. 156-601.000.

Flum, Paul L., to Paul Flum Ideas, Inc. Display unit with modular capability. 4,930,643, Cl. 211-188.000.

Fluoroware, Inc.: *See*—
Williams, Randall S.; Peterson, Michael D.; and Nentl, Robert J., 4,930,634, Cl. 206-454.000.

FMC Corporation: *See*—
Titsworth, Raymond; Lipe, J. Tom; Dale, James L.; Monroe, Hanford D.; and Hill, Jerry M., 4,931,964, Cl. 364-559.000.
Ungchusri, Tep; and Earl, Paul M., 4,930,791, Cl. 277-151.000.

Focke & Co. (GmbH & Co.): *See*—
Focke, Heinz; and Liedtke, Kurt, 4,930,292, Cl. 53-588.000.
Focke, Heinz; and Liedtke, Kurt, 4,931,633, Cl. 250-223.00R.

Focke, Heinz; and Liedtke, Kurt, to Focke & Co. (GmbH & Co.). Apparatus for wrapping articles with a film web. 4,930,292, Cl. 53-588.000.

Focke, Heinz; and Liedtke, Kurt, to Focke & Co. (GmbH & Co.). Packaging machine for cigarettes with shaft wall mounted sensors. 4,931,633, Cl. 250-223.00R.

Fogarasi, Gabor; Sivo, Imre; Zacsek, Gabor; and Zakarias, Istvan, to Taurus Gumiipari Vallalat. Form carrier and actuating device for the vulcanization of tires for motor vehicles. 4,931,004, Cl. 425-28.100.

Folkens, Jerry D.: *See*—
Young, Sheldon E.; Young, Michael L.; and Folkens, Jerry D., 4,930,741, Cl. 248-542.000.

Folsom, Mark, to Whittaker Ordnance, Inc. Method for sealing optical windows in explosive initiators. 4,930,418, Cl. 102-201.000.

Fontaine, Michel; and Bonneau, Marc. Capsicum and populas useful for the treatment of alcoholic toxicomania. 4,931,277, Cl. 424-195.100.

Fontichiaro, Dominic: *See*—
Kabat, Daniel M.; and Fontichiaro, Dominic, 4,930,470, Cl. 123-195.00R.

Forchheim, Hans; and Schlieder, Matthias, to Bauakademie d. Deutschen Dem. Republik. Hydraulic lifting cylinder-piston unit. 4,930,402, Cl. 91-167.00R.

Ford Aerospace Corporation: *See*—
Garg, Subhash C.; and Gretz, Bruce D., 4,931,942, Cl. 364-459.000.
Nelson, William W.; Lesko, Camille A.; Kennedy, Andrew M., II; and Dunn, Vernon E., 4,931,753, Cl. 333-161.000.

Ford, Douglas L.; Anderson, Eric W.; and Kopp, Clinton V., to Memtec Limited. Concentration of solids in a suspension. 4,931,186, Cl. 210-636.000.

Ford, John E.; and Myers, Albert, to General Electric Company. Integral fuel nozzle cover for gas turbine combustor. 4,930,703, Cl. 239-424.000.

Ford, Michael E.: *See*—
Burgoyne, William F., Jr.; Langsam, Michael; Ford, Michael E.; and Casey, Jeremiah P., 4,931,182, Cl. 210-500.390.

Ford Motor Company: *See*—
Gajewski, Kenneth J., 4,931,706, Cl. 318-282.000.
Gaston, Robert D., 4,931,764, Cl. 338-185.000.
Grinn, Gary J., 4,930,836, Cl. 296-146.000.
Kabat, Daniel M.; and Fontichiaro, Dominic, 4,930,470, Cl. 123-195.00R.
Stockhausen, William F., 4,930,468, Cl. 123-188.00M.
Van Selous, Joseph S., 4,930,376, Cl. 74-867.000.

Ford New Holland, Inc.: *See*—
Crego, John B.; Sheehan, Ronald T.; and VanGinhoven, Robert M., 4,930,530, Cl. 134-6.000.
Hurlburt, Joseph C., 4,930,295, Cl. 56-10.900.
Naaktgeboren, Adrianus, 4,930,411, Cl. 100-4.000.
Schoonheere, Marnix J.; Lippens, Christiaan A. C.; and Naaktgeboren, Adrianus, 4,930,410, Cl. 100-3.000.
VanGinhoven, Robert M., 4,930,944, Cl. 406-97.000.

Foreman, Mark M.; Garbrecht, William L.; Marzoni, Gifford P.; and Whitten, Kathleen R., to Eli Lilly and Company. Cycloalkylamides of (8β)-1-alkyl-6-(substituted) ergolines. 4,931,447, Cl. 514-288.000.
Fosgate Inc.: *See*—
Fosgate, James W., 4,932,059, Cl. 381-22.000.
Fosgate, James W., to Fosgate Inc. Variable matrix decoder for periphonic reproduction of sound. 4,932,059, Cl. 381-22.000.
Foss, George D.: *See*—
Calhoun, Clyde D.; Foss, George D.; Fleming, Maurice J.; and Bruxvoort, Wesley J., 4,930,266, Cl. 51-293.000.
Foster, Chris D.: *See*—
Keeney, Clare G.; Passon, Gary L.; Hagen, Ronald J.; Foster, Chris D.; and Fritsch, Frank J., 4,932,022, Cl. 370-60.000.
Foster, Clark B.: *See*—
Haber, Terry M.; and Foster, Clark B., 4,931,040, Cl. 604-110.000.
Foster, George N.; Petty, Herbert E.; Blevins, Charles H., II; and King, Roswell E., III, to Union Carbide Chemicals and Plastics Company Inc. Olefin polymer compositions containing polyorganosiloxanes and the use thereof in the production of film material and polyorganosiloxanes. 4,931,492, Cl. 524-188.000.
Fourcroy, Antone L.: *See*—
McDermott, Mark W.; and Fourcroy, Antone L., 4,931,748, Cl. 331-1.00A.
Fournier, Joel, to Societe d'Applications Generales d'Electricite. Printed circuit board components with alternate mounting modes. 4,931,679, Cl. 310-71.000.
Fourrey, Francois; Deley, Serge; and Coussemacq, Jean M., to ECIA - Equipements et Composants pour l'Industrie Automobile. Locking device for the guiding slide of a vehicle seat or the like. 4,930,736, Cl. 248-430.000.
Franco, Robert S.; and Weiner, Murray. Method for introducing desired agents into red blood cells. 4,931,276, Cl. 424-533.000.
Francois, Thirion C.: *See*—
Boucard, Michel R. J.; and Francois, Thirion C., 4,931,908, Cl. 361-395.000.
Frankena, Hidde, to Lever Brothers Company. Automatic dishwashing detergent comprising quaternary ammonium salt. 4,931,217, Cl. 252-547.000.
Frankfurt, Robert. Security credit card. 4,931,629, Cl. 235-488.000.
Fransson, Gosta; and Gorder, Charles, to Gordic Trading AB. Machine for packing tablets into tubes. 4,930,289, Cl. 53-251.000.
Frantz, Ronald F., to International Healthcare Products, Inc. Contour retaining support cushion. 4,930,171, Cl. 5-450.000.
Frappier, Edward P.: *See*—
Hull, Ezekiel H.; and Frappier, Edward P., 4,931,583, Cl. 560-180.000.
Frassek, Karl-Heinz: *See*—
Beck, Heinz; Frassek, Karl-Heinz; Verhulst, Eduard M.; and Giezen, Egenius A., 4,931,197, Cl. 252-56.00R.
Frechin, Jean P. Snap hook for use in climbing, pot holing or similar activities. 4,930,194, Cl. 24-573.500.
Fredette, Maurice C. J.; and Yang, Ching-Shi, to Tenneco Canada Inc. Production of chlorine dioxide. 4,931,268, Cl. 423-479.000.
Freisleben, Horst; Scharfenberg, Gottfried; Sepp, Gunther; Benedikter, Richard; and Schnaebele, Werner, to Messerschmitt-Boelkow-Blohm Gesellschaft mit beschraenkter Haftung. Situation display system for attachment to a headgear. 4,930,888, Cl. 356-152.000.
Freitag, Douglas W., to LTV Aerospace and Defense Company. Method for producing structures by isostatic compression. 4,931,241, Cl. 264-86.000.
Frericks, David L.: *See*—
Herbst, Donald J.; Fay, Richard D.; Frericks, David L.; and Blair, Bruce A., 4,931,018, Cl. 434-234.000.
Fresenius AG: *See*—
Faeser, Ulrich, 4,931,041, Cl. 604-155.000.
Friction Technology Limited: *See*—
Bedford, Gerald M.; and Richards, Peter J., 4,930,675, Cl. 228-112.000.
Friebe, Walter-Gunar; Reinholz, Erhard; Doerge, Liesel; and Stegmeier, Karlheinz, to Boehringer Mannheim GmbH. Heterocyclic substituted alkylsulphonamides pharmaceutical compositions containing them, and arterial disease treatment therewith. 4,931,462, Cl. 514-419.000.
Fried, Herbert E.: *See*—
Edwards, Charles L.; Fried, Herbert E.; and Lilienthal, Werner, 4,931,205, Cl. 252-174.210.
Friedman, Nick: *See*—
Fuhrmann, Norbert; and Friedman, Nick, 4,931,793, Cl. 340-903.000.
Friedrich, Hans-Helmut: *See*—
Wirth, Hermann O.; and Friedrich, Hans-Helmut, 4,931,576, Cl. 549-514.000.
Frigerio, Giuliano; Roda, Aldo; and Roda, Enrico, to Gipharmex S.p.A. Complex of products for the rapid and not-invasive treatment of biliary calculosis. 4,931,038, Cl. 604-22.000.
Fritsch, Frank J.: *See*—
Keeney, Clare G.; Passon, Gary L.; Hagen, Ronald J.; Foster, Chris D.; and Fritsch, Frank J., 4,932,022, Cl. 370-60.000.
Fritz, Andre; and Gerlinger, Jean, to Bator S.A., Societe Anonyme. Apparatus for assembling a roof frame with a post, for making framework and structures. 4,930,268, Cl. 52-90.000.
Froes, Francis H.: *See*—
Eylon, Daniel; Froes, Francis H.; and Welsch, Gerhard, 4,931,253, Cl. 419-25.000.
Fromtling, Robert A.; Giacobbe, Robert A.; Liesch, Jerrold M.; Del Val, Sagrario M.; Schwartz, Robert E.; and Wichmann, Carol F., to Merck & Co., Inc. Antifungal fermentation product. 4,931,352, Cl. 435-71.300.
Fruhauf, Serge; and Sourgen, Laurent, to SGS-Thomson Microelectronics, S.A. Safety device against the unauthorized detection of protected data. 4,932,053, Cl. 380-4.000.
Fuchs, Hugo; Agab, David; Neubauer, Gerald; and Ritz, Josef, to BASF Aktiengesellschaft. Storability of molten cyclohexanone oxime. 4,931,592, Cl. 564-267.000.
Fuchs, Peter, to Vastag Automobiltechnik Gesellschaft m.b.H. Structural part comprising a flange and at least one exhaust gas tube, in particular exhaust gas bend, and process for the production thereof. 4,930,817, Cl. 285-189.000.
Fuel Concepts, Inc.: *See*—
Czerwinski, Kenneth S.; Gabany, Eugene; Sharma, Shanti S.; and Turko, John W., 4,930,550, Cl. 137-334.000.
Fuhrer, Walter: *See*—
Buhlmayer, Peter; Rasetti, Vittorio; Fuhrer, Walter; Stanton, James L.; and Goschl, Richard, 4,931,591, Cl. 564-165.000.
Fuhrmann, Norbert; and Friedman, Nick, to Solitron Devices, Inc. System for providing a warning when vehicles approach a common collision point. 4,931,793, Cl. 340-903.000.
Fuji Electric Co., Ltd.: *See*—
Ito, Shinichi, 4,931,666, Cl. 307-315.000.
Nishiura, Masaharu, 4,931,873, Cl. 358-213.110.
Fuji Jukogyo Kabushiki Kaisha: *See*—
Suzuki, Takashi; and Kimura, Yukio, 4,930,206, Cl. 29-525.200.
Tsukada, Teruhisa; Saito, Masao; Fuse, Masao; and Sakon, Nobuharu, 4,930,811, Cl. 280-834.000.
Fuji Photo Film Co., Ltd.: *See*—
Adachi, Yuuma; Nakajima, Nobuyoshi; and Ishida, Masamitsu, 4,931,644, Cl. 250-327.200.
Ando, Shigeru, 4,931,891, Cl. 360-99.060.
Haneda, Norihisa, 4,931,336, Cl. 428-64.000.
Hirano, Masato; and Tadokoro, Eiichi, 4,931,378, Cl. 430-264.000.
Hosoi, Yuichi; Takahashi, Kenji; and Arakawa, Satoshi, 4,931,642, Cl. 250-327.200.
Komatsu, Kazunori; and Uetake, Toshikazu, 4,931,309, Cl. 427-48.000.
Miyagawa, Ichiro; and Arai, Noboru, 4,930,869, Cl. 350-6.800.
Morigaki, Masakazu; Kawagishi, Toshio; Nakazyo, Kiyoshi; Seto, Nobuo; and Kamei, Sadao, 4,931,382, Cl. 430-512.000.
Nakamura, Takashi, 4,931,652, Cl. 250-484.100.
Ohgoda, Makoto, 4,931,641, Cl. 250-327.200.
Shiozawa, Etsuo; Kato, Keishi; and Yoshimi, Yoshiki, 4,931,334, Cl. 428-137.000.
Takenaka, Yuji, 4,931,832, Cl. 355-77.000.
Tokuda, Kanji, 4,931,863, Cl. 358-78.000.
Yoshino, Tatsuo, 4,931,827, Cl. 355-38.000.
Fujii, Katsutoshi: *See*—
Yoshioka, Hirosuke; Obata, Tokio; Fujii, Katsutoshi; Yoshiya, Haruo; Tsutsumiuchi, Kiyoshi; and Shikita, Shoji, 4,931,455, Cl. 514-256.000.
Fujii, Kenji: *See*—
Yamamoto, Tohru; Takeo, Tadashi; Ichinose, Kiyohiro; Ozawa, Syogo; Fujii, Kenji; Fujii, Saburo; Enomoto, Mashayuki; Ishibashi, Ichiro; and Murayama, Junichi, 4,931,322, Cl. 427-421.000.
Fujii, Saburo: *See*—
Yamamoto, Tohru; Takeo, Tadashi; Ichinose, Kiyohiro; Ozawa, Syogo; Fujii, Kenji; Fujii, Saburo; Enomoto, Mashayuki; Ishibashi, Ichiro; and Murayama, Junichi, 4,931,322, Cl. 427-421.000.
Fujii, Shigeaki: *See*—
Hoshino, Akira; Saji, Mikio; and Fujii, Shigeaki, 4,931,360, Cl. 428-328.000.
Fujii, Syuso: *See*—
Ogihara, Masaki; Okada, Yoshio; and Fujii, Syuso, 4,931,992, Cl. 365-189.110.
Fujiie, Kazuhiko: *See*—
Yoshida, Tadao; Fujiie, Kazuhiko; and Ando, Ryo, 4,932,016, Cl. 369-48.000.
Fujimoto, Hiroyuki: *See*—
Watanabe, Nobuatsu; Tohara, Hidekazu; Matsumura, Yuji; and Fujimoto, Hiroyuki, 4,931,163, Cl. 208-44.000.
Fujimoto, Takasori; and Hara, Toshirou, to Mitsubishi Denki Kabushiki Kaisha. Engine control apparatus. 4,930,481, Cl. 123-481.000.
Fujimura, Toshio: *See*—
Kojima, Shinji; Matsukawa, Toshitane; Mizota, Hisakazu; Yuhara, Susumu; Yoshimoto, Yoshio; Fujimura, Toshio; and Ito, Kunihiro, 4,930,207, Cl. 29-527.500.
Fujioka, Shigeru: *See*—
Yamao, Yasuo; and Fujioka, Shigeru, 4,931,387, Cl. 435-25.000.
Fujisawa, Mutsuo; Kameda, Tsutomu; Katsura, Hirofumi; Yamaga, Reiichi; and Ishido, Setsuko, to Toyo Chemical Laboratories, Inc. Sealer for filling a dental root canal. 4,931,096, Cl. 106-35.000.
Fujisawa Pharmaceutical Company, Ltd.: *See*—
Kamiya, Takashi; Saito, Yoshihisa; Teraji, Tsutomu; Nakaguit, Osamu; Oku, Teruo; Nakamura, Hitoshi; and Hashimoto, Masashi, 4,931,555, Cl. 540-222.000.
Nakashima, Mitsuyoshi; Kanamaru, Mitsutaka; Sugiyama, Akira; and Terakawa, Masato, 4,931,440, Cl. 514-259.000.
Takasugi, Hisashi; Kuno, Atsushi; Sakai, Hiroyoshi; Sugiyama, Yoshie; and Takaya, Takao, 4,931,453, Cl. 514-252.000.
Fujise, Kazuki: *See*—
Baba, Takeaki; Nanba, Keizo; Takeshima, Yoshio; Sano, Hiromichi; Tobita, Koji; Muneto, Atsuo; Hara, Toshihiro; and Fujise, Kazuki, 4,931,340, Cl. 428-73.000.

Fujita, Masafumi; Saijo, Takao; and Tezuka, Kazuhiko, to Minolta Camera Kabushiki Kaisha. Reader-printer. 4,931,828, Cl. 355-45.000.

Fujita, Takashi, to Mitsubishi Petrochemical Company Limited. Polymerization of ethylene. 4,931,517, Cl. 526-128.000.

Fujitsu Limited: *See—*
Ema, Taiji. 4,931,845, Cl. 357-71.000.
Kimura, Takafumi; Yamawaki, Hideki; Ikeda, Kazuto; and Ihara, Masaru, 4,931,425, Cl. 505-1.000.
Kodama, Yukinori; and Furuyama, Takaaki, 4,932,000, Cl. 365-230.060.

Fujiwara, Hisashige: *See—*
Fukuda, Hisatoshi; and Fujiwara, Hisashige, 4,931,743, Cl. 328-167.000.

Fujiwara, Kouhei: *See—*
Toda, Haruhisa; Fujiwara, Kouhei; Hosogai, Setsuo; and Shioguchi, Kazumi, 4,931,602, Cl. 200-144.00R.

Fujiwara, Masami: *See—*
Akabane, Yasuhiro; Tamura, Takamitsu; and Fujiwara, Masami, 4,931,562, Cl. 546-19.000.

Fujiwara, Shinsuke, to NEC Home Electronics Ltd. Paper feeder. 4,930,916, Cl. 400-636.000.

Fukawa, Isaburo; and Tanabe, Tsuneaki, to Asahi Kasei Kogyo Kabushiki Kaisha. Novel aromatic polyether and a process for producing an ether. 4,931,530, Cl. 528-125.000.

Fukaya, Masaki; Kawakami, Soichiro; Itabashi, Satoshi; Terada, Katsunori; Gofuku, Ihachiro; Nakagawa, Katsumi; Hatanaka, Katsunori; Isobe, Yoshinori; Saika, Toshihiro; Kaneko, Tetsuya; Kitahara, Nobuko; and Suzuki, Hideyuki, to Canon Kabushiki Kaisha. Photoelectric conversion device having a common semiconductor layer for a portion of the photoelectric conversion element and a portion of the transfer transistor section. 4,931,661, Cl. 250-578.100.

Fukuda, Hisatoshi; and Fujiwara, Hisashige, to Victory Company of Japan, Ltd. Noise reduction circuit. 4,931,743, Cl. 328-167.000.

Fukui, Tetsuro: *See—*
Miyazaki, Takeshi; and Fukui, Tetsuro, 4,931,337, Cl. 428-64.000.

Fukumochi, Yoji: *See—*
Kugimiya, Shuzo; Fukumochi, Yoji; Nakamura, Ichiko; Hirai, Tokuyuki; and Suzuki, Hitoshi, 4,931,936, Cl. 364-419.000.

Fukushima, Eiji: *See—*
Kawano, Satoshi; Kimura, Yoshio; and Fukushima, Eiji, 4,930,955, Cl. 409-225.000.

Fuller, Lloyd J.: *See—*
Brooks, Lynwood C.; Fuller, Lloyd J.; Russo, Randolph J.; and Russo, Robert P., 4,930,642, Cl. 211-71.000.

Fulmor, Irvin E., III: *See—*
Grover, Gary J.; and Fulmor, Irvin E., III, 4,931,460, Cl. 514-381.000.

Fulton, William R., to Symons Corporation. Box culvert traveler for use with concrete forming systems. 4,930,937, Cl. 405-149.000.

Fultz, Clinton; and Dalton, Stanley. Automatic latching container having good thermal insulation. 4,930,681, Cl. 229-114.000.

Funae, Yasuaki: *See—*
Matsuda, Tatsuhito; Funae, Yasuaki; Yoshida, Masahiro; and Takaya, Tsuguo, 4,931,521, Cl. 526-286.000.

Funamoto, Hiroyuki: *See—*
Sugita, Toshio; Funamoto, Hiroyuki; Furuta, Kazuyoshi; and Koseki, Osamu, 4,931,307, Cl. 427-38.000.

Funderburk, Donald G.: *See—*
Hassanzadeh, Reza; Funderburk, Donald G.; Schwartz, Steven A.; and Rock, Edward T., 4,931,740, Cl. 324-457.000.

Furukawa, Kenji; and Terashima, Kanetsugu, to Chisso Corporation; and Hitachi, Ltd. Ferroelectric chiral smectic liquid crystal composition. 4,931,208, Cl. 252-299.610.

Furukawa, Yasuyoshi: *See—*
Kawachi, Shoji; Tomoda, Masayasu; Oka, Masahiko; Furukawa, Yasuyoshi; and Tanaka, Hiroyuki, 4,931,511, Cl. 525-326.300.

Furuta, Kazuyoshi: *See—*
Sugita, Toshio; Funamoto, Hiroyuki; Furuta, Kazuyoshi; and Koseki, Osamu, 4,931,307, Cl. 427-38.000.

Furuya, Nagakazu: *See—*
Watanabe, Masahiro; Motoo, Satoshi; and Furuya, Nagakazu, 4,931,168, Cl. 204-284.000.

Furuyama, Takaaki: *See—*
Kodama, Yukinori; and Furuyama, Takaaki, 4,932,000, Cl. 365-230.060.

Fuse, Masao: *See—*
Tsukada, Teruhisa; Saito, Masao; Fuse, Masao; and Sakon, Nobuharu, 4,930,811, Cl. 280-834.000.

Fuseya, Yoshiro: *See—*
Asano, Makoto; Tsutsumi, Haruki; Tanaka, Eishi; Fuseya, Yoshiro; Hasegawa, Kiyoharu; and Akahori, Hiroyuki, 4,931,420, Cl. 503-205.000.

Fushimi, Masahiro: *See—*
Shimizu, Isamu; and Fushimi, Masahiro, 4,931,308, Cl. 427-39.000.

Fushiya, Fusao; Yamazaki, Takashi; and Saito, Mikio, to Makita Electric Works, Ltd. Portable battery-powered tool. 4,930,583, Cl. 173-109.000.

Fuss, Eric W.: *See—*
Fuss, Jarvis R.; Fuss, Eric W.; Fuss, Roy M.; and Fuss, Roger D., 4,930,580, Cl. 172-15.000.

Fuss, Jarvis R.; Fuss, Eric W.; Fuss, Roy M.; and Fuss, Roger D. Vehicle mounted lawn edger. 4,930,580, Cl. 172-15.000.

Fuss, Roger D.: *See—*
Fuss, Jarvis R.; Fuss, Eric W.; Fuss, Roy M.; and Fuss, Roger D., 4,930,580, Cl. 172-15.000.

Fuss, Roy M.: *See—*
Fuss, Jarvis R.; Fuss, Eric W.; Fuss, Roy M.; and Fuss, Roger D., 4,930,580, Cl. 172-15.000.

G. D. Searle & Co.: *See—*
Hanson, Gunnar J.; and Baran, John S., 4,931,429, Cl. 514-19.000.

G. Walter Steffens GmbH & Co.: *See—*
Steffens, Michael, 4,930,709, Cl. 241-282.200.

Gabany, Eugene: *See—*
Czerwinski, Kenneth S.; Gabany, Eugene; Sharma, Shanti S.; and Turko, John W., 4,930,550, Cl. 137-334.000.

Gaddipati, Achuta R.: *See—*
Singh, Raj N.; and Gaddipati, Achuta R., 4,931,311, Cl. 427-56.100.

Gaffar, Abdul; Polefka, Thomas G.; Ferlauto, Robert J., Jr.; and Crisafulli, Rosemarie M., to Colgate-Palmolive Company. Anticalculus oral composition. 4,931,273, Cl. 424-52.000.

Gajewski, Kenneth J., to Ford Motor Company. Electrical circuit for protecting a power supply connected to apply signals to a retractable sunroof containing materials that respond to an applied electrical signal. 4,931,706, Cl. 318-282.000.

Galileo Electro-Optics Corp.: *See—*
Tosswill, Christopher H., 4,931,688, Cl. 313-336.000.

Gallmeyer, William W.: *See—*
Schofield, Kenneth; Gallmeyer, William W.; and Zwiep, Theodore C., 4,930,742, Cl. 248-475.100.

Gally, Daniel; and Jobert, Pierre P., to Thomson-CSF. Ion bombardment barrier layer for a vacuum tube. 4,931,693, Cl. 313-528.000.

Gansser, Robert: *See—*
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Garavuso, Gerald M., to Xerox Corporation. Pneumatic compiling apparatus. 4,930,766, Cl. 271-220.000.

Garbe, Heyno; and Hanses, Diethard, to Asea Brown Boveri Ltd. Arrangement for measuring transfer impedances of coaxial cables. 4,931,720, Cl. 324-627.000.

Garbrecht, William L.: *See—*
Foreman, Mark M.; Garbrecht, William L.; Marzoni, Gifford P.; and Whitten, Kathleen R., 4,931,447, Cl. 514-288.000.

Gardner, Gary W.: *See—*
Dowd, James P.; Boyer, Charles C.; and Gardner, Gary W., 4,931,156, Cl. 204-147.000.

Gardner, Hugh C.: *See—*
Qureshi, Shahid P.; Gardner, Hugh C.; and Newman-Evans, Richard H., 4,931,496, Cl. 524-612.000.

Garg, Subhash C.; and Gretz, Bruce D., to Ford Aerospace Corporation. Transition control system for spacecraft attitude control. 4,931,942, Cl. 364-459.000.

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Porter, Eshmal L.; Wozniak, Walter E.; and Garner, Gerald D., 4,930,701, Cl. 239-102.200.

Garreau, Francois: *See—*
Blanchard, Gilbert; Garreau, Francois; Prigent, Michel; and Dozieres, Richard, 4,931,419, Cl. 502-304.000.

Gartland, Albert J., Jr.; and Lawlor, Michael J., to Hubbell Incorporated. Contact clip for wiring devices. 4,931,024, Cl. 439-856.000.

Gas Application Products (GAP) Inc.: *See—*
Allan, Alexander, 4,930,490, Cl. 126-92.00R.

Gas Research Institute: *See—*
McFadden, David H., 4,930,489, Cl. 126-41.00R.
Pearman, A. Noel J.; Hunter, Gerald D.; and Woessner, Michael A., 4,930,488, Cl. 126-39.00E.

Gaston, Robert D., to Ford Motor Company. Low wear resistor card for use in a liquid fuel sender circuit. 4,931,764, Cl. 338-185.000.

Gates, Richard A., to Eastman Kodak Company. Camera view finder. 4,931,818, Cl. 354-222.000.

Gaudino, Larry J., to Technitrol, Inc. Silver electrode for electrochemical cell. 4,930,211, Cl. 29-623.500.

Gavin, Laurie N.: *See—*
Gillen, Wendy N.; Gavin, Laurie N.; and Neubauer, Jean C., 4,930,235, Cl. 40-152.000.

Gay, Jackson G.: *See—*
Richter, Roy; Gay, Jackson G.; and Kromer, Robert P., 4,931,944, Cl. 364-468.000.

Gayen, Swapan: *See—*
Alfano, Robert R.; Petricevic, Vladimir; and Gayen, Swapan, 4,932,031, Cl. 372-41.000.

Gebhardt, Arne W.; Muller, Horst G.; and Stacker, Gunther H., to U.S. Philips Corporation. Method and apparatus for producing a test signal for use in a video recorder. 4,931,877, Cl. 358-335.000.

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Gelman, Gideon. Combination heated scraper and brush. 4,930,176, Cl. 15-4.000.

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Lavoie, Michel; and Gendron, Gaetan, 4,930,617, Cl. 198-692.000.

General Atomics: *See—*
Breneman, Bruce C.; Purcell, John R.; and Sarwinski, Raymond E., 4,931,759, Cl. 335-301.000.

General Electric Company: *See—*
Boutni, Omar M.; Nelson, Linda H.; Patterson, Dwight J.; Pratt, Charles F.; and Savenije, Herman B., 4,931,503, Cl. 525-67.000.

Brzozowski, Steven J., 4,930,318, Cl. 62-51.100.
Bulman, Melvin J., 4,930,423, Cl. 102-440.000.
Castonguay, Roger N.; Klein, Keith W.; Arnold, David; and Ellis, Preston L., 4,931,603, Cl. 200-144.00R.
Coppa, Anthony P., 4,930,930, Cl. 403-171.000.
Ford, John E.; and Myers, Albert, 4,930,703, Cl. 239-424.000.
Jackson, Melvin R., 4,931,254, Cl. 420-426.000.
Knoble, David W., 4,931,699, Cl. 315-276.000.
Muncy, Donald G.; and Plotts, William B., 4,931,615, Cl. 219-121.670.
Poling, Ronald W., 4,931,604, Cl. 200-406.000.
Singh, Raj N.; and Gaddipati, Achuta R., 4,931,311, Cl. 427-56.100.
Slutz, David E.; Gigl, Paul D.; Flood, Gary M.; and Smith, Gary W., 4,931,363, Cl. 428-408.000.

General Engineering (Netherlands) B.V.: *See*—
Haglund, Artur L., 4,930,195, Cl. 24-636.000.

General Motors Corporation: *See*—
Disser, Robert J.; and Lehnhoff, Richard N., 4,931,707, Cl. 318-293.000.
Oakley, Charles D., 4,931,686, Cl. 313-141.000.
Richter, Roy; Gay, Jackson G.; and Kromer, Robert P., 4,931,944, Cl. 364-468.000.
Schenk, Donald E.; and Miller, Jon E., 4,930,608, Cl. 192-3.290.

GenRad, Inc.: *See*—
Karash, Karl; and Bentzen, Steen, 4,931,742, Cl. 324-541.000.

Genz, Joachim: *See*—
Pakull, Ralf; Eckhardt, Volker; Genz, Joachim; Idel, Karsten; Kricheldorf, Hans-Rytger; and Doring, Volker, 4,931,534, Cl. 528-193.000.

George, Gary. Fire extinguishing device for the home heating plant utilizing an existing spigot as the water source. 4,930,579, Cl. 169-54.000.

George, Kevin: *See*—
Putman, Rob R.; and George, Kevin, 4,931,809, Cl. 343-882.000.

George, Pascal: *See*—
Sevrin, Mireille; George, Pascal; and Morel, Claude, 4,931,449, Cl. 514-291.000.

Gerdau, Thomas; Kleiner, Hans-Jerg; Peuckert, Marcellus; Bruck, Martin; and Aldinger, Fritz, to Hoechst Aktiengesellschaft. Polymeric hydridosilazanes and processes for their preparation and their use. 4,931,513, Cl. 525-474.000.

Gerhardsson, Sven L., to Aktiebolaget Electrolux. Combined closing and airing furniture for a door. 4,930,818, Cl. 292-29.000.

Gericke, Rolf: *See*—
Baumgarth, Manfred; Gericke, Rolf; Lues, Ingeborg; De Peyer, Jacques; and Bergmann, Rolf, 4,931,454, Cl. 514-254.000.

Gerken, Rudolf: *See*—
Lailach, Gunter; and Gerken, Rudolf, 4,931,269, Cl. 423-522.000.

Gerlinger, Jean: *See*—
Fritz, Andre; and Gerlinger, Jean, 4,930,268, Cl. 52-90.000.

Gerlitz, Jonathan, to Sofin Ltd. Combiner for optical or electro-optical systems. 4,930,868, Cl. 350-3.700.

Gershon, Beth K.: *See*—
Berger-Neel, Bonnie; Gershon, Beth K.; and Groff, John P., 4,931,446, Cl. 514-254.000.

Gessay, Jean-Claude: *See*—
Charlier, Jacques; Dupeuble, Paul; and Gessay, Jean-Claude, 4,930,940, Cl. 405-267.000.

Geverink, Hendrikus J.; and Assinck, Leonardus W. Conveyor belt drive system. 4,930,624, Cl. 198-835.000.

Geyer, Joel Erwin; Lee, Joseph K.; Norman, Vernon R.; and Wilson, Kenneth T., to International Business Machines Corporation. Frame stripping protocol for early token release in a ring communication network. 4,932,023, Cl. 370-85.400.

Ghadjar, Fathali G.: *See*—
Ghajar, Jamshid B. G.; Hariri, Robert J.; and Ghadjar, Fathali G., 4,931,056, Cl. 606-130.000.

Ghajar, Jamshid B. G.; Hariri, Robert J.; and Ghadjar, Fathali G., to Neurodynamics, Inc. Catheter guide apparatus for perpendicular insertion into a cranium orifice. 4,931,056, Cl. 606-130.000.

Giacobbe, Robert A.: *See*—
Fromtling, Robert A.; Giacobbe, Robert A.; Liesch, Jerrold M.; Del Val, Sagrario M.; Schwartz, Robert E.; and Wichmann, Carol F., 4,931,352, Cl. 435-71.300.

Gianni Bulgari S.p.A.: *See*—
Perucchi, Norberto, 4,932,010, Cl. 368-80.000.

Gibson, Michael S.; Hawkins, Larry N.; Peffly, Marjorie M.; Kenneally, Corey J.; and Corrigan, Patrick J., to Procter & Gamble Company, The. Production of polyol polyesters having reduced color content. 4,931,552, Cl. 536-119.000.

Gibson, Robert L. Double drain. 4,930,164, Cl. 4-199.000.

Giesaler, Josef, to Prototyp-Werke GmbH Fabrik fur Prazisionswerkzeuge. Thread milling cutter. 4,930,949, Cl. 408-222.000.

Giezen, Egenius A.: *See*—
Beck, Heinz; Frassek, Karl-Heinz; Verhulst, Eduard M.; and Giezen, Egenius A., 4,931,197, Cl. 252-56.00R.

Gigl, Paul D.: *See*—
Slutz, David E.; Gigl, Paul D.; Flood, Gary M.; and Smith, Gary W., 4,931,363, Cl. 428-408.000.

Gilad, Shalev: *See*—
Succari, Shmuel; Gilad, Shalev; Nagler, Michael; Beiber, Avigdor; and Berman, Dov, 4,931,637, Cl. 250-235.000.

Gilbarco Inc.: *See*—
Devine, George T., 4,930,665, Cl. 222-28.000.

Gilbertson, Mark: *See*—
Lanius, Charles; and Gilbertson, Mark, 4,930,591, Cl. 180-65.100.

Gilian Instrument Corp.: *See*—
Fleming, William T., Jr., 4,931,000, Cl. 417-534.000.

Gill, Devinder S.; and Andrulis, Peter J., Jr. Platinum-polymer complexes and their use as antitumor agents. 4,931,553, Cl. 536-121.000.

Gillen, Wendy N.; Gavin, Laurie N.; and Neubauer, Jean C. Phone number display device. 4,930,235, Cl. 40-152.000.

Gillet, Gerard: *See*—
Sabater, Jacques; and Gillet, Gerard, 4,931,659, Cl. 250-571.000.

Gilliam, Mark A., to Tabs, Inc. Torque verification apparatus and method. 4,930,951, Cl. 411-14.000.

Gillund, Ronald D., to Mathews Company. Front mounted implement. 4,930,801, Cl. 280-481.000.

Gilson Medical Electronics (France): *See*—
Bonneyrat, Alain; and Langlais, Christian, 4,930,991, Cl. 417-18.000.

Gipharmex S.p.A.: *See*—
Frigerio, Giuliano; Roda, Aldo; and Roda, Enrico, 4,931,038, Cl. 604-22.000.

Giroux, Edward J. Wheel. 4,930,844, Cl. 301-63.0PW.

Giuffrida, Anthony J., to Millipore Corporation. Electrodeionization method and apparatus. 4,931,160, Cl. 204-301.000.

Giuseppe, Bianchi, to Scriba S.p.A. Process for making variously shaped waffle products, especially having a cone or similar shape, for icecreams and foods. 4,931,301, Cl. 426-505.000.

Glaise, Rene J.; and Huon, Pierre, to International Business Machines Corporation. Programmable sequencing device for controlling fast complex processes. 4,931,985, Cl. 364-900.000.

Gleason, Henry A., III; and Jamieson, Jerel S., to Johnson Service Company. Microprocessor-based controller with synchronous reset. 4,931,975, Cl. 364-570.000.

Gleixner, Ronald; and Heidenfelder, Anton, to Siemens Aktiengesellschaft. Housing for a small motor. 4,931,683, Cl. 310-89.000.

Glennon, Oliver; and Zylstra, Henry J., to Square D Company. Loss of neutral or ground protection circuit. 4,931,893, Cl. 361-45.000.

Gloyer, Wolfgang. Multiple pack for a plurality of cylindrical containers. 4,930,633, Cl. 206-428.000.

Gluck, Roland; Heilemann, Otto; and Klingmann, Rolf, to Daimler-Benz AG. Sealing arrangement for an engine timing housing cover. 4,930,792, Cl. 277-235.00B.

Godfrey, Christopher R. A.: *See*—
Clough, John M.; and Godfrey, Christopher R. A., 4,931,438, Cl. 514-241.000.

Goessler, Gerhard, to E.G.O. Elektro-Gerate Blanc u. Fischer. Electric heater. 4,931,621, Cl. 219-467.000.

Goetz, Bernhard. High voltage measurement capacitor. 4,931,843, Cl. 361-323.000.

Goetz, Norbert: *See*—
Hoelderich, Wolfgang; and Goetz, Norbert, 4,931,564, Cl. 546-286.000.

Goff, Larry; King, Lawrence A.; Barnett, Daniel B.; and Justice, Samuel P., to Texas Instruments Incorporated. Low noise chopper stabilized amplifier and method of operation. 4,931,745, Cl. 330-9.000.

Gofuku, Ihachiro: *See*—
Fukaya, Masaki; Kawakami, Soichiro; Itabashi, Satoshi; Terada, Katsunori; Gofuku, Ihachiro; Nakagawa, Katsumi; Hatanaka, Katsunori; Isobe, Yoshinori; Saika, Toshihiro; Kaneko, Tetsuya; Kitahara, Nobuko; and Suzuki, Hideyuki, 4,931,661, Cl. 250-578.100.

Goh, Atsushi; Endo, Keiji; and Yamamoto, Yuri, to Mitsubishi Petrochemical Co., Ltd. Novel 2-nitro-5-(substituted phenoxy)benzohydroximic acid derivatives. 4,931,088, Cl. 71-100.000.

Gold/daig, Joseph E.; and McKinney, Larry G., to Kohler Co. Automated casting apparatus. 4,931,007, Cl. 425-438.000.

Goldenberg, Ephraim: *See*—
Croitoru, Natan; Dror, Jacob; Goldenberg, Ephraim; Mendelovic, David; and Israel, Ganot, 4,930,863, Cl. 350-96.320.

Goldfein, Melvin M.: *See*—
Mikoll, Joseph F.; Goldfein, Melvin M.; and Berner, John M., 4,930,808, Cl. 280-751.000.

Goldstar Co., Ltd.: *See*—
Hwang, Hak S., 4,930,720, Cl. 242-198.000.

Goldstein, Irwin; de Tejada, Inigo S.; and Riblet, Leslie A. Agents for treatment of male impotence. 4,931,445, Cl. 514-252.000.

Golembiewski, Alan L.: *See*—
Thurston, John F.; and Golembiewski, Alan L., 4,930,357, Cl. 73-861.190.

Gonsior, Wolfgang, to Xomox International GmbH & Co. Shutoff and regulating valve. 4,930,748, Cl. 251-163.000.

Gontowski, Walter S., to Cherry Semiconductor Corporation. Voltage controlled oscillator. 4,931,750, Cl. 331-111.000.

Goodman, Barry I., to Hunter Douglas Inc. Decoratively covered blind structure. 4,930,562, Cl. 160-236.000.

Goodman, Jerome J.: *See*—
Manley, Robert Q.; and Goodman, Jerome J., 4,930,679, Cl. 228-212.000.

Goodman, Maxine: *See*—
Goodman, Van R.; and Goodman, Maxine, 4,930,780, Cl. 273-146.000.

Goodman, Van R.; and Goodman, Maxine. Dice game. 4,930,780, Cl. 273-146.000.

Goodrich, Raymond P., Jr.: *See*—
Baldeschwieler, John D.; and Goodrich, Raymond P., Jr., 4,931,361, Cl. 428-402.200.

Goradia, Dhanvant H.; Phillips, Fred W.; and Schluge, Gregory, to Sperry Marine Inc. Spread spectrum squaring loop with invalid phase measurement rejection. 4,932,036, Cl. 375-1.000.

Gord, John C., to Alfred E. Mann Foundation. Digital to analog signal converter. 4,931,795, Cl. 341-135.000.

Gorder, Charles: *See*—
Fransson, Gosta; and Gorder, Charles, 4,930,289, Cl. 53-251.000.

Gordic Trading AB: *See*—
Fransson, Gosta; and Gorder, Charles, 4,930,289, Cl. 53-251.000.

Gordon, Robert L.; Rehm, Robert E.; and Sosnowski, Robert, to International Paper Company. Recloseable lid construction for a paperboard container. 4,930,682, Cl. 229-123.300.

Goschl, Richard: *See*—
Buhlmayer, Peter; Rasetti, Vittorio; Fuhrer, Walter; Stanton, James L.; and Goschl, Richard, 4,931,591, Cl. 564-165.000.

Goss, George T. Road grader attachment. 4,930,582, Cl. 172-788.000.

Gotanda, Masakazu: *See*—
Takehana, Sakae; Ueda, Yasuhiro; Gotanda, Masakazu; Sakurai, Tomohisa; and Adachi, Hideyuki, 4,930,494, Cl. 128-4.000.

Goto, Hisashi: *See*—
Takase, Hiroshi; Goto, Hisashi; Inoue, Takashi; Sakurai, Hidenori; and Kimura, Akiteru, 4,930,881, Cl. 350-445.000.

Goto, Koichi: *See*—
Uchida, Hiroyuki; and Goto, Koichi, 4,930,908, Cl. 384-480.000.

Grabe, Gerhard: *See*—
Fischer, Roland; Grabe, Gerhard; and Niemann, Ekkehard, 4,931,412, Cl. 437-225.000.

Graeber, Johannes: *See*—
Bleckmann, Hans W.; Fennel, Helmut; Graeber, Johannes; Determann, Otto; and Batistic, Ivica, 4,930,845, Cl. 303-100.000.

Graham, Neil B.: *See*—
Embrey, Mostyn; and Graham, Neil B., 4,931,288, Cl. 424-486.000.

Graham, Richard D., II: *See*—
MacIntyre, Hazen L.; Graham, Richard D., II; and Aldava, Michael B., 4,931,738, Cl. 324-435.000.

Granger, Stanley W.; Beard, Joseph O.; and Sveen, Frode. Variable bore ram rubber. 4,930,745, Cl. 251-1.100.

Grantom, Charles. Well sealing apparatus and method. 4,930,577, Cl. 166-387.000.

Gray, Randall C.; and Jarrett, Robert, to Motorola Inc. Load response control and method. 4,931,717, Cl. 323-299.000.

Great Neck Saw Manufacturers, Inc.: *See*—
Jacoff, Daniel, 4,930,218, Cl. 30-162.000.

Green, Laddie L.: *See*—
Pallos, Ferenc M.; Lin, Kang-Chi; and Green, Laddie L., 4,931,580, Cl. 560-13.000.

Greenfeld, Norton R. Apparatus for analyzing source code. 4,931,928, Cl. 364-300.000.

Greenlees, Thomas A.: *See*—
Bandhopadhyay, Deb K.; Greenlees, Thomas A.; and Rubbelke, David L., 4,930,348, Cl. 73-472.000.

Gregg, Lauri C.: *See*—
Hayward, Alan G.; Gregg, Lauri C.; Dutrisac, Aurele L.; and Joliat, Jack J., 4,930,595, Cl. 181-104.000.

Grego, Giorgio, to Cselt - Centro Studi E Laboratori Telecomunicazioni S.P.A. Electrooptic deflector. 4,930,853, Cl. 350-96.140.

Gregoris Photo Equipment S.p.A.: *See*—
Renzo, Panontin, 4,930,672, Cl. 226-119.000.

Gresz, Gunter; and Kohlstedde, Werner, to SMS Schloemann-Siemag Aktiengesellschaft. Rotary basket winder with water cooling. 4,930,715, Cl. 242-83.000.

Greszczuk, John A., to Codex Corporation. Multimode modem. 4,931,250, Cl. 375-8.000.

Gretz, Bruce D.: *See*—
Garg, Subhash C.; and Gretz, Bruce D., 4,931,942, Cl. 364-459.000.

Griffin, Cortland L., to McDonnell Douglas Corporation. Wheel spin-up tester. 4,930,362, Cl. 73-865.300.

Griffin, James D., to Dana-Farber Cancer Institute. Monoclonal antibody specific to neutrophils. 4,931,395, Cl. 435-240.270.

Griffith, Carl D. Individual blade control system for helicopters. 4,930,988, Cl. 416-114.000.

Grillo, John L., to Lee Company, The. Pressure relief valve. 4,930,553, Cl. 137-508.000.

Grillon, Jean; and Moreau, Christian, to Thomson-CSF. Digital system for generating laser-modulation multi-channel circuit control signals for an oscillating mirror projector of scanned images. 4,931,874, Cl. 358-231.000.

Grimm, Duane H., to Sundstrand Corporation. Rotary travel limit stop. 4,930,611, Cl. 192-139.000.

Grinn, Gary J., to Ford Motor Company. Door assembly for pick-up trucks. 4,930,836, Cl. 296-146.000.

Groff, John P.: *See*—
Berger-Neel, Bonnie; Gershon, Beth K.; and Groff, John P., 4,931,446, Cl. 514-254.000.

Grollier, Jean-Francois; Cotteret, Jean; and Rosembaum, Georges, to L'Oreal. Dyeing composition for keratinous fibres containing at least one co-solubilized n-substituted 2-nitro-para-phenylenediamine and process for dyeing keratinous fibres therewith. 4,931,066, Cl. 8-410.000.

Groner, Alois; and Rencurosi, Fabien, to Bischof und Klein GmbH & Co. Cross-bottom or block-bottom valve sack. 4,930,904, Cl. 383-45.000.

Groover, Robert, III: *See*—
Tigelaar, Howard L.; Haken, Roger A.; Holloway, Thomas C.; and Groover, Robert, III, 4,931,411, Cl. 437-192.000.

Gross, Joseph, to Hair Remover, Ltd. Device for removing hair. 4,931,054, Cl. 606-43.000.

Grosser, Rolf: *See*—
Schwartz, Ulrich; Grosser, Rolf; Piejko, Karl-Erwin; Bomer, Bruno; and Arlt, Dieter, 4,931,525, Cl. 526-305.000.

Grosset & Dunlap, Inc.: *See*—
Mann, Philip, 4,931,017, Cl. 434-87.000.

Grover, Gary J.; and Fulmor, Irvin E., III, to E. R. Squibb & Sons, Inc. Post-ischemic myocardial dysfunction using thromboxane A_2 antagonists. 4,931,460, Cl. 514-381.000.

Grover, Gary J.; and Bergey, James L., to E. R. Squibb & Sons, Inc. Method of reducing pre- and post-ischemic myocardial arrhythmias and fibrillation. 4,931,464, Cl. 514-423.000.

Gruene, Hans-Georg: *See*—
Weckherlen, Werner; Dellit, Hans-Joachim; and Gruene, Hans-Georg, 4,930,230, Cl. 34-168.000.

Grumman Aerospace Corporation: *See*—
Cirrito, Vincent; Koubek, Kevin J.; and Quadrini, John A., 4,931,905, Cl. 361-385.000.
Kadar, Ivan, 4,931,868, Cl. 358-105.000.
Kolbert, Melvin, 4,932,057, Cl. 380-33.000.

Grundfos International a/s: *See*—
Jensen, Niels D.; and Christensen, Jorgen, 4,930,996, Cl. 417-373.000.

Grundl, Andreas: *See*—
Heidelberg, Gotz; Grundl, Andreas; and Rosner, Peter, 4,931,677, Cl. 310-12.000.

Gruning, Burghard: *See*—
Zsifkovits, Wilhelm; Gruning, Burghard; Kollmeier, Hans-Joachim; Schaefer, Dietmar; and Weitemeyer, Christian, 4,931,362, Cl. 428-402.220.

GTE Laboratories Incorporated: *See*—
Stoddard, James C.; and Tweedy, Ernest P., 4,931,872, Cl. 358-183.000.

GTE Products Corporation: *See*—
Brower, Boyd G., 4,931,696, Cl. 315-61.000.
Knoll, William C., 4,931,664, Cl. 307-10.300.
Mellor, Charles E., 4,931,315, Cl. 427-167.000.

Guajardo, Ciro, to Teledyne Industries, Inc. Circuitry for indicating the presence of an overload or short circuit in solid state relay circuits. 4,931,778, Cl. 340-664.000.

Gualtieri, Devlin M.; and Chai, Bruce H. T., to Allied-Signal Inc. High temperature solution growth of barium borate (β-BaB_2O_4). 4,931,133, Cl. 156-621.000.

Gueret, Jean-Louis, to L'Oreal. Applicator unit including device for compacting the product on the applicator. 4,930,919, Cl. 401-126.000.

Guerra, Gaetano: *See*—
Corradini, Paolo; De Rosa, Claudio; Guerra, Gaetano; Nicolais, Luigi; Petraccone, Vittorio; and Attalla, Giancarlo, 4,931,325, Cl. 428-35.700.

Guinard Oil Services: *See*—
Guinard, Paul, 4,931,176, Cl. 210-179.000.

Guinard, Paul, to Guinard Oil Services. Installation for the separation of the constituents of a suspension. 4,931,176, Cl. 210-179.000.

Gunderson, Inc.: *See*—
Saxton, Gregory J.; and Kaleta, Gary S., 4,930,426, Cl. 105-355.000.

Gupta, Ramesh K.: *See*—
Assal, Francois T.; Evans, John V.; Mahle, Christoph E.; Zaghloul, Amir I.; and Gupta, Ramesh K., 4,931,802, Cl. 342-356.000.

Gust, Kenneth K. Oil drain system. 4,930,602, Cl. 184-106.000.

H. F. Hanscom & Co., Inc.: *See*—
Hanscom, John F., 4,930,293, Cl. 53-590.000.

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Hackman, Lloyd E.; Dickson, James; Dunlap, David L.; and Handshey, Mark E., to Ribbon Technology Corporation. Melt overflow system for producing filamentary and film products directly from molten materials. 4,930,565, Cl. 164-463.000.

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Haddock, John T.; Miller, Charles A.; Moist, Stanford C., Jr.; Nauman, Warren D.; and Pala, Ronald S., to AMP Incorporated. Method for assembly of lanyard and connector. 4,930,209, Cl. 29-592.100.

Haden, Inc.: *See*—
Johnson, Jeffrey C., 4,930,343, Cl. 73-196.000.

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Cramer, Randall J.; and Haendler, Blanca L., 4,931,207, Cl. 252-187.260.

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Wilfong, Harry B., Jr.; and Haenni, Edwin W., 4,930,385, Cl. 225-106.000.

Haffer, Dieter; and Jost, Hermann J., to Masa Maschinenfabrik Olga Kossmann. Elastic suction plates for delicate objects. 4,931,341, Cl. 428-81.000.

Hafner, Josef: *See*—
Ponisch, Martin; Hafner, Josef; and Schoenberger, Rolf, 4,930,425, Cl. 104-172.400.
Hagen, Ronald J.: *See*—
Keeney, Clare G.; Passon, Gary L.; Hagen, Ronald J.; Foster, Chris D.; and Fritsch, Frank J., 4,932,022, Cl. 370-60.000.
Hagiwara, Ikuo: *See*—
Ando, Susumu; and Hagiwara, Ikuo, 4,931,961, Cl. 361-535.000.
Haglund, Artur L., to General Engineering (Netherlands) B.V. Present invention relates to a safety-belt buckle. 4,930,195, Cl. 24-636.000.
Hahn, Ulf: *See*—
Meffert, Wolfgang; Silligmann, Kalr-Heinz; Fischer, Siegmar; and Hahn, Ulf, 4,930,420, Cl. 102-374.000.
Hailperin, Max: *See*—
Syre, Jean-Claude; Westphal, Harald; and Hailperin, Max, 4,931,931, Cl. 364-300.000.
Hair Remover, Ltd.: *See*—
Gross, Joseph, 4,931,054, Cl. 606-43.000.
Hajik, Robert M.: *See*—
Wardle, Robert B.; Hinshaw, Jerald C.; and Hajik, Robert M., 4,931,112, Cl. 149-88.000.
Hakamada, Haruo, to Konica Corporation. Trimming device for use with photographic paper printer. 4,931,829, Cl. 355-68.000.
Haken, Roger A.: *See*—
Tigelaar, Howard L.; Haken, Roger A.; Holloway, Thomas C.; and Groover, Robert, III, 4,931,411, Cl. 437-192.000.
Hakes, Rowe: *See*—
Turin, Paul S.; Wilkes, Robert D., Jr.; and Hakes, Rowe, 4,930,586, Cl. 175-25.000.
Hale, Cecil H.; and Sharifian, Hossein, to Southwestern Analytical Chemicals, Inc. Production of metal borohydrides and organic onium borohydrides. 4,931,154, Cl. 204-59.00R.
Hale, John R., to RCA Licensing Corp. Electron gun assembly having a reinforced heater tab with locating means. 4,931,691, Cl. 313-417.000.
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Berryman, Leslie N.; Horinek, Herbert J.; Phillippi, Max L.; Prucha, David A.; Reidenbach, Vincent G.; and Stephenson, Stanley V., 4,930,576, Cl. 166-308.000.
Hamada, Kousuke: *See*—
Yagi, Hisanori; Hamada, Kousuke; Nakano, Isamu; and Nishimura, Yoshihiro, 4,931,359, Cl. 428-325.000.
Hamada, Masataka; Ishida, Tokuji; and Akada, Yasuaki, to Minolta Camera Kabushiki Kaisha. Automatic focus adjusting apparatus. 4,931,821, Cl. 354-402.000.
Hamajima, Shigemitsu: *See*—
Kakinami, Toshiaki; and Hamajima, Shigemitsu, 4,931,937, Cl. 364-424.010.
Hamamatsu Photonics Kabushiki Kaisha: *See*—
Hiruma, Teruo; and Ohsuka, Shinji, 4,931,647, Cl. 250-368.000.
Hamanaka, Osamu: *See*—
Abuyama, Yasuo; Ide, Fumito; Hamanaka, Osamu; and Sanbayashi, Takeshi, 4,931,837, Cl. 355-245.000.
Hamano, Junichi, to Takasago Electric Industry Co., Ltd. Electronic parts processing machine. 4,931,128, Cl. 156-362.000.
Hamaoka, Takahiro: *See*—
Suzuki, Shinichi; Deguchi, Hiroyuki; Hamaoka, Takahiro; and Hibino, Sokichi, 4,930,995, Cl. 417-312.000.
Hamba Maschinenfabrik Hans A. Muller GmbH & Co. KG: *See*—
Bausch, Franz-Hubert, 4,930,345, Cl. 73-45.400.
Hamilton, Chris A., to Dialogic Corporation. Method and apparatus for frequency analysis of telephone signals. 4,932,062, Cl. 381-43.000.
Hamilton-Sattui: *See*—
Lewis, Ralph H., 4,930,843, Cl. 301-63.0PW.
Hamm, Robert N.; Hunter, Scott R.; Hurst, George S.; Turner, James E.; and Wright, Harvel A., to Pellissippi International. Ionizing radiation detector system. 4,931,653, Cl. 250-385.100.
Hamm, Ronald L., to Hanna, Ronald, a part interest. Therapeutic device. 4,930,767, Cl. 272-96.000.
Hammer, Klaus-Dieter; Winter, Hermann; and Buettner, Rolf, to Hoechst Aktiengesellschaft. Sausage casing with improved uniformity of diameter. 4,930,545, Cl. 138-118.100.
Han, Tai-Kang; and Chang, Tai-Feng. Energy regenerative apparatus for a water hammer type pump. 4,930,993, Cl. 417-226.000.
Hanawa, Masatoshi, to Kabushiki Kaisha Toshiba. Method and apparatus for determining shim coil current in nuclear magnetic resonance imaging. 4,931,733, Cl. 324-318.000.
Hancock, William R., to Honeywell Inc. Method and apparatus to scan convert radar video to television outputs. 4,931,801, Cl. 342-185.000.
Handke, Gunther, to Fichtel & Sachs AG. Suspension leg for a motor vehicle. 4,930,803, Cl. 280-668.000.
Handshey, Mark E.: *See*—
Hackman, Lloyd E.; Dickson, James; Dunlap, David L.; and Handshey, Mark E., 4,930,565, Cl. 164-463.000.
Haneda, Norihisa, to Fuji Photo Film Co., Ltd. Information recording medium and method of optically recording information employing the same. 4,931,336, Cl. 428-64.000.
Hanna, Ronald: *See*—
Hamm, Ronald L., 4,930,767, Cl. 272-96.000.
Hannigan, Joseph M.: *See*—
Derham, James J.; Hannigan, Joseph M.; and Derham, Joseph, 4,931,187, Cl. 210-662.000.
Hanscom, John F., to H. F. Hanscom & Co., Inc. Automatic banding machine. 4,930,293, Cl. 53-590.000.
Hansen, Diethard: *See*—
Garbe, Heyno; and Hansen, Diethard, 4,931,720, Cl. 324-627.000.
Hansen, Paul E.: *See*—
Becker, Dennis L.; Tochacek, Miroslav; and Hansen, Paul E., 4,931,343, Cl. 428-95.000.
Hansen, Robert A.: *See*—
Baker, Russ J.; and Hansen, Robert A., 4,930,364, Cl. 73-865.800.
Hanson, Curtis O. Nonremovable wall-mounted night light assembly. 4,931,911, Cl. 362-95.000.
Hanson, Gunnar J.; and Baran, John S., to G. D. Searle & Co. α-aminoacyl β-aminoacyl aminodiols as anti-hypertensive agents. 4,931,429, Cl. 514-19.000.
Hanssler, Gerd: *See*—
Fest, Christa; Brandes, Wilhelm; Dutzmann, Stefan; Hanssler, Gerd; and Kuck, Karl-Heinz, 4,931,465, Cl. 514-477.000.
Hanus, John P. One piece container with foldable top closure and blank therefore. 4,930,680, Cl. 229-110.000.
Hara, Akira; and MacPhee, John, to Baldwin-Japan Limited. Automatic web guide roller cleaning device. 4,930,415, Cl. 101-228.000.
Hara, Kozo: *See*—
Kobayashi, Shoichi; Mikuni, Katsuhiko; Monma, Mitsuru; Takano, Toshiya; Hara, Kozo; and Hashimoto, Hitoshi, 4,931,389, Cl. 435-95.000.
Hara, Minoru: *See*—
Nakajima, Yukio; and Hara, Minoru, 4,931,823, Cl. 354-412.000.
Hara, Toshihiro: *See*—
Baba, Takeaki; Nanba, Keizo; Takeshima, Yoshio; Sano, Hiromichi; Tobita, Koji; Muneto, Atsuo; Hara, Toshihiro; and Fujise, Kazuki, 4,931,340, Cl. 428-73.000.
Hara, Toshirou: *See*—
Fujimoto, Takanori; and Hara, Toshirou, 4,930,481, Cl. 123-481.000.
Hara, Yasuhiko; and Endo, Kenzo, to Hitachi Ltd. Method and apparatus for detecting through-hole voids in multi-layer printed wiring board. 4,930,890, Cl. 356-241.000.
Hara, Yoshinori: *See*—
Wada, Keisuke; Hara, Yoshinori; and Sasaki, Koushi, 4,931,573, Cl. 549-325.000.
Harada, Noritake: *See*—
Kawabata, Takanobu; and Harada, Noritake, 4,930,416, Cl. 101-364.000.
Harbison, James P.: *See*—
Aspnes, David E.; Bhat, Rajaram; Colas, Etienne G.; Florez, Leigh T.; Harbison, James P.; and Studna, Amabrose A., 4,931,132, Cl. 156-601.000.
Harder, William F., to Air Preheater Company, Inc., The. Heat transfer element assembly. 4,930,569, Cl. 165-10.000.
Hardt, Heinz; and Wandle, Rudolf. Contact arrangement for the battery of an in-ear hearing aid. 4,931,369, Cl. 429-98.000.
Harditke, Hans-Herlof, to Lisega GmbH. Yoke pipe clip. 4,930,732, Cl. 248-62.000.
Hare, Nicholas S., Sr. Electro-rheological valve control mechanism. 4,930,463, Cl. 123-90.110.
Hariri, Robert J.: *See*—
Ghajar, Jamshid B. G.; Hariri, Robert J.; and Ghadjar, Fathali G., 4,931,056, Cl. 606-130.000.
Harr, Thomas: *See*—
Korner, Wolf-Dietrich; and Harr, Thomas, 4,930,471, Cl. 123-196.00R.
Harra, John. Frozen food composition. 4,931,321, Cl. 426-615.000.
Harris, Diane F.; and Harris, Ted D. Casino board game. 4,930,789, Cl. 273-256.000.
Harris, Richard S.: *See*—
Johnson, Joel C.; and Harris, Richard S., 4,930,901, Cl. 372-26.000.
Harris, Ted D.: *See*—
Harris, Diane F.; and Harris, Ted D., 4,930,789, Cl. 273-256.000.
Harrod, Lawrence R., to Kransco. Riding vehicle. 4,930,796, Cl. 280-87.021.
Hart, Frank J. Passive infrared display devices. 4,930,236, Cl. 40-414.000.
Hart, Richard S.: *See*—
Valiga, Richard A.; and Hart, Richard S., 4,930,831, Cl. 296-26.000.
Hartai, Julius: *See*—
Olsen, Terje; Lekven, Nils C.; and Hartai, Julius, 4,931,730, Cl. 324-209.000.
Hartley Controls Corporation: *See*—
Knopp, Leslie C.; and Baumgartle, Kenneth M., 4,930,354, Cl. 73-823.000.
Hartman, Neil W., to Fleck Aerospace Limited Partnership. Gas compressor for jet engine. 4,930,309, Cl. 60-267.000.
Hartman, Peter: *See*—
Plee, Steven L.; Hartman, Peter; Martin, Jay K.; Nolan, J. Paul; Remboski, Donald J., Jr.; and Ross, Richard R., 4,930,478, Cl. 123-425.000.
Hartmann, Heinrich: *See*—
Kucera, Clare H.; Crema, Stefano C.; Roznowski, Michael D.; Konrad, Gerd; and Hartmann, Heinrich, 4,931,489, Cl. 523-130.000.
Harton, Shelby H. Portable hay feeder. 4,930,449, Cl. 119-60.000.
Haruna, Takayuki: *See*—
Sasaki, Takeshi; Takakuwa, Yoshio; Haruna, Takayuki; and Yamada, Kiyoharu, 4,930,380, Cl. 82-117.000.
Hase, Takashi: *See*—
Kagami, Akiyasu; and Hase, Takashi, 4,931,651, Cl. 250-484.100.

Hasegawa, Kiyoharu: *See*—
Asano, Makoto; Tsutsumi, Haruki; Tanaka, Eishi; Fuseya, Yoshiro; Hasegawa, Kiyoharu; and Akahori, Hiroyuki, 4,931,420, Cl. 503-205.000.

Hasegawa, Masaru; Suda, Osamu; Kohno, Hisao; Sekino, Toshifumi; Umezaki, Tetsuhiro; and Tanaka, Norio, to Dainichiseika Color & Chemicals Mfg. Co. Electrophotographic photoreceptor having an azo compound. 4,931,349, Cl. 430-58.000.

Hasegawa, Yoshinori; and Hirai, Kiyofumi, to Pioneer Electronic Corporation. Digital-to-analog conversion circuit. 4,931,796, Cl. 341-154.000.

Hasenkamp, Friederich, to Maschinenbau Gerold GmbH & Co. KG. Installation for producing metal girders. 4,930,329, Cl. 29-897.350.

Hashiguchi, Koichi: *See*—
Tosaka, Akio; Sakata, Kei; Hashiguchi, Koichi; Higashino, Tateo; and Ichida, Toshio, 4,931,106, Cl. 148-12.00C.

Hashimoto, Akihiko, to Olympus Optical Co. Ltd. Method and apparatus for manufacturing optical card. 4,931,138, Cl. 156-659.100.

Hashimoto, Akihiro: *See*—
Tanaka, Toyoaki; Ohira, Katuzi; Nakamura, Akira; Kamei, Ryosuke; and Hashimoto, Akihiro, 4,931,005, Cl. 425-83.100.

Hashimoto, Hitoshi: *See*—
Kobayashi, Shoichi; Mikuni, Katsuhiko; Monma, Mitsuru; Takano, Toshiya; Hara, Kozo; and Hashimoto, Hitoshi, 4,931,389, Cl. 435-95.000.

Hashimoto, Masashi: *See*—
Kamiya, Takashi; Saito, Yoshihisa; Teraji, Tsutomu; Nakaguit, Osamu; Oku, Teruo; Nakamura, Hitoshi; and Hashimoto, Masashi, 4,931,555, Cl. 540-222.000.

Hashimoto, Mitsuru: *See*—
Shimada, Tomoyuki; Sasaki, Masaomi; and Hashimoto, Mitsuru, 4,931,350, Cl. 430-59.000.

Hashimoto, Takaaki: *See*—
Kenmochi, Toshio; and Hashimoto, Takaaki, 4,932,048, Cl. 379-67.000.

Hashizume, Hiroshi, to Kabushiki Kaisha Toshiba. Electrophotographic recording apparatus for a facsimile device. 4,931,876, Cl. 358-300.000.

Hashizume, Junichiro: *See*—
Iida, Shigehira; Arai, Takayoshi; Hashizume, Junichiro; Takei, Tetsuya; and Saitoh, Keishi, 4,930,442, Cl. 118-723.000.

Hashizume, Kenji; Okamura, Masatoshi; and Shiba, Haruo, to TDK Corporation. Reel for a magnetic tape. 4,930,714, Cl. 242-71.800.

Hasiguchi, Makoto: *See*—
Ide, Yutaka; and Hasiguchi, Makoto, 4,930,320, Cl. 62-184.000.

Hasa, David. Microcomputer controlled faucet. 4,931,938, Cl. 364-152.000.

Hassanzadeh, Reza; Funderburk, Donald G.; Schwartz, Steven A.; and Rock, Edward T., to McDonnell Douglas Corporation. Electrostatic field gradient sensor. 4,931,740, Cl. 324-457.000.

Hastert, James L.: *See*—
Roy, Donald W.; and Hastert, James L., 4,930,731, Cl. 244-316.000.

Hata, Yasuaki; Yasukawa, Takeshi; and Onishi, Masayoshi, to Mitsubishi Denki Kabushiki Kaisha. Rotation detecting device having a terminal holding arrangement. 4,931,728, Cl. 324-207.150.

Hatada, Koichi: *See*—
Okamoto, Yoshio; Hatada, Koichi; Shibata, Tohru; Namikoshi, Hajime; and Okamoto, Ichiro, 4,931,184, Cl. 210-635.000.

Hatakeyama, Yoshiharu, to Yoshida Industry Co., Ltd. Vanity case. 4,930,528, Cl. 132-301.000.

Hatanaka, Katsunori: *See*—
Fukaya, Masaki; Kawakami, Soichiro; Itabashi, Satoshi; Terada, Katsunori; Gofuku, Ihachiro; Nakagawa, Katsumi; Hatanaka, Katsunori; Isobe, Yoshinori; Saika, Toshihiro; Kaneko, Tetsuya; Kitahara, Nobuko; and Suzuki, Hideyuki, 4,931,661, Cl. 250-578.100.

Hatanaka, Kouji: *See*—
Ogata, Yasunobu; Kurihara, Koichiro; Masaka, Mitsuuke; and Hatanaka, Kouji, 4,931,619, Cl. 219-270.000.

Hatje, Guenther H., to Helmut K. Pinsch GmbH & Co. Method of enhancing the well-being of a living creature. 4,930,505, Cl. 128-398.000.

Hatkevitz, Zvi; Maylor, Ken; and Jacques, Roland, to Parlex Corporation. Method of using laser routing to form a rigid/flex circuit board. 4,931,134, Cl. 156-630.000.

Hattori, Yasuo: *See*—
Ikematsu, Takeshi; Hattori, Yasuo; Inoki, Yoshihiro; and Tanaka, Mitsuhiro, 4,931,376, Cl. 526-164.000.

Hauptman, Reuben D.: *See*—
Baral, Elliott; Brown, Percy B.; Hauptman, Reuben D.; Jaeger, Richard J., Jr.; LaPorta, Frank C.; Lauber, Pamela J.; LeCronier, Richard E.; Nelson, Randall H.; Russell, Thomas L., Jr.; and Ying, Wen-Ping, 4,932,042, Cl. 379-67.000.

Hawkins, Larry N.: *See*—
Gibson, Michael S.; Hawkins, Larry N.; Peffly, Marjorie M.; Kenneally, Corey J.; and Corrigan, Patrick J., 4,931,552, Cl. 536-119.000.

Hawley, James M.: *See*—
Jaeger, Hugh D.; and Hawley, James M., 4,931,028, Cl. 446-225.000.

Haws, Spencer K., to Alternative Energy Resources, Inc. Automatic hot water recovery apparatus. 4,930,551, Cl. 137-337.000.

Hayakawa, Hiroshi; Maenishi, Hiroaki; and Okamoto, Kazuo, to Mazda Motor Corporation. System for transferring vehicle body from a coating station to an assembly line and an overhead conveyor. 4,930,213, Cl. 29-793.000.

Hayakawa, Osamu: *See*—
Takeuchi, Kunihiko; Akita, Yoshisuke; and Hayakawa, Osamu, 4,930,992, Cl. 417-20.000.

Hayaoka, Tatsumi: *See*—
Kato, Shoichi; and Hayaoka, Tatsumi, 4,931,474, Cl. 514-708.000.

Hayasaki, Koichi, to Nissan Motor Co., Ltd. Automatic transmission pressure-regulating valve with filtered flow to outlet pressure feedback chamber. 4,930,313, Cl. 60-454.000.

Hayashi, Tatsuo: *See*—
Ogawa, Sumitaka; and Hayashi, Tatsuo, 4,931,940, Cl. 364-431.030.

Hayashida, Shinichiro; Okashiro, Hidetoshi; and Yoroza, Shunichi, to Toray Industries, Inc. Method for controlling the thickness of a sheet material and method for monitoring a correspondence relationship between the thickness distribution across a sheet material and means for adjusting the thickness. 4,931,982, Cl. 364-473.000.

Hayashida, Teruki: *See*—
Yamada, Teruaki; Ukena, Toshiyasu; Akisue, Osamu; Kawai, Kenji; Sano, Yuuji; and Hayashida, Teruki, 4,931,107, Cl. 148-12.300.

Hayashizaki, Hiroaki: *See*—
Arai, Tatsuo; Saito, Takayoshi; Tsujimura, Osamu; and Hayashizaki, Hiroaki, 4,930,945, Cl. 407-40.000.

Hayek, Zamir, to Dranez Anstalt. Ventilator apparatus and fluid control valve. 4,930,498, Cl. 128-30.200.

Hayes, Michael E.: *See*—
Covington, J. Stansill; McBride, Michael A.; and Hayes, Michael E., 4,931,192, Cl. 210-751.000.

Hayes, Richard A., to Du Pont de Nemours, E. I., and Company. Highly-soluble, amorphous siloxane polyimides. 4,931,539, Cl. 528-353.000.

Hayes, William K.: *See*—
Boyer, Billy G.; Nelson, Lloyd M.; Soucie, Wayne L.; and Hayes, William K., 4,930,605, Cl. 188-2.00D.

Haynes, Ronald L.; Hoelscher, Charles H.; and Lasch, Jonathan G., to PPG Industries, Inc. Organic photochromic pigment particulates. 4,931,220, Cl. 252-586.000.

Hayward, Alan G.; Gregg, Lauri C.; Dutrisac, Aurele L.; and Joliat, Jack J., to Falconbridge Limited. Method and apparatus for determining the profile of a subterranean passage. 4,930,595, Cl. 181-104.000.

Heck, Siegfried, to Roboflex Ltd. Hydraulic drive apparatus and method for instrumented penetration and tensile-impact testing. 4,930,355, Cl. 73-840.000.

Heckler & Koch, GmbH: *See*—
Brandl, Rudolf; and Matt, Heinz, 4,930,400, Cl. 89-34.000.

Heeres, Jan: *See*—
Van Wauwe, Jean P. F.; Heeres, Jan; and Backx, Leo J. J., 4,931,444, Cl. 514-252.000.

Heffelfinger, Michael T.: *See*—
Liu, Leland L.; Heffelfinger, Michael T.; and Whyman, Donald G., 4,931,327, Cl. 428-36.500.

Heflinger, Lee O.: *See*—
Clark, George L.; Heflinger, Lee O.; Roychoudhuri, Chandrasekhar; Brooks, Robert E.; and Sharma, Madan M., 4,930,855, Cl. 350-96.190.

Hegde, Suryanarayan G.; Scranton, Robert A.; and Yarmchuk, Edward J., to International Business Machines Corporation. Capacitive measurement and control of the fly height of a recording slider. 4,931,887, Cl. 360-75.000.

Hegler, Ralph-Peter: *See*—
Hegler, Wilhelm; and Hegler, Ralph-Peter, 4,930,936, Cl. 405-49.000.

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Heichler, Johannes, to ANT Nachrichtentechnik GmbH. Method and apparatus for correcting errors in convolutional code signals. 4,932,029, Cl. 371-43.000.

Heidelberg, Gotz; Grundl, Andreas; and Rosner, Peter. Electro-magnetic linear drive. 4,931,677, Cl. 310-12.000.

Heidelberger Druckmaschinen AG: *See*—
Wirz, Arno, 4,930,414, Cl. 101-183.000.

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Gleixner, Ronald; and Heidenfelder, Anton, 4,931,683, Cl. 310-89.000.

Heidenreich, Holger; and Wehling, Klaus, to Miles Inc. Indicators for the detection of thiol groups. 4,931,579, Cl. 558-29.000.

Heijman, Maritza G. J.: *See*—
Angenent, Johannes H.; Heijman, Maritza G. J.; and Spierings, Dijsbertus A. C. M., 4,931,077, Cl. 65-31.000.

Heil Company, The: *See*—
Bechtold, Guy L., 4,931,772, Cl. 340-573.000.

Heilemann, Otto: *See*—
Gluck, Roland; Heilemann, Otto; and Klingmann, Rolf, 4,930,792, Cl. 277-235.00B.

Heilmann, Steven M.; Krepski, Larry R.; Moren, Dean M.; Rasmussen, Jerald K.; and Smith, Howell K., II, to Minnesota Mining and Manufacturing Company. Fluorinated, acrylamide-functional monomers. 4,931,582, Cl. 560-172.000.

Heimann, Sigismund: *See*—
Baumgarte, Ulrich; Fikentscher, Rolf; Heimann, Sigismund; Mertens, Heinrich; Schneider, Siegfried; and Vescia, Michele, 4,931,065, Cl. 8-188.000.

Hein-Werner Corporation: *See*—
Tiegs, Mark D.; and Kurten, Michael J., 4,930,261, Cl. 51-105.0VG.

Heinemann Electric Company: *See*—
Fierro, Joseph, 4,931,762, Cl. 337-66.000.

Heintke, Hans E.: *See*—
Wolf, Jurgen; Jestadt, Albrecht; Heintke, Hans E.; and Odemer, Michael, 4,930,217, Cl. 30-43.920.
Heinz, Hartmut: *See*—
Bergner, Joachim; Danz, Rainer; and Heinz, Hartmut, 4,930,878, Cl. 350-394.000.
Heitmann, Jurgen: *See*—
Mester, Roland; Loos, Rolf; Heitmann, Jurgen; and Muller, Jurgen, 4,931,885, Cl. 360-48.000.
Heller, Harry G., to PPG Industries, Inc. Photochromic spiropyran compounds. 4,931,221, Cl. 252-586.000.
Hellige GmbH: *See*—
Ullrich, Georg J., 4,930,506, Cl. 128-633.000.
Helmut K. Pinch GmbH & Co.: *See*—
Hatje, Guenther H., 4,930,505, Cl. 128-398.000.
Helsel, Leta O.: *See*—
Hoffman, Paul S.; Helsel, Leta O.; Bibb, William F.; and McKinney, Roger M., 4,931,547, Cl. 530-387.000.
Hemphill, Fred S. Cooking grease disposal bag. 4,930,906, Cl. 383-89.000.
Hench, Hans. Rotary cutter, particularly for comminuting plastic material. 4,930,710, Cl. 241-294.000.
Henderson, H. Thurman, to University of Cincinnati. Solid state microanemometer with improved sensitivity and response time. 4,930,347, Cl. 73-189.000.
Henderson, Norman L.: *See*—
Kim, Kwon H.; Henderson, Norman L.; and Chien, Yie W., 4,931,281, Cl. 424-448.000.
Hendrix, James E.: *See*—
Tolbert, Thomas W.; Dugan, Jeffrey S.; Cauthen, John V.; and Hendrix, James E., 4,931,342, Cl. 428-90.000.
Henke, Reinhold: *See*—
Werdin, David A.; and Henke, Reinhold, 4,930,214, Cl. 29-830.000.
Henkel Kommanditgesellschaft auf Aktien: *See*—
Schenker, Gilbert; Piorr, Robert; and Luettge, Sabine, 4,931,218, Cl. 252-551.000.
Wilsberg, Heinz-Manfred; Bosserhoff, Georg; Puchta, Rolf; and Bucheler, Herbert, 4,931,063, Cl. 8-137.000.
Henline, John W., to Clark Equipment Company. Operator guidebar for a walk-beside articulated machine. 4,930,589, Cl. 180-19.100.
Hennegan, Richard T.: *See*—
Wen, Cheng P.; and Hennegan, Richard T., 4,931,799, Cl. 342-110.000.
Henny Penny Corporation: *See*—
King, James D.; and Werts, Stephen D., 4,930,408, Cl. 99-407.000.
Henriksen, William; Katz, Louis; and Wuchinich, David G., to Sonomed, Inc. Hand held spring-loaded ultrasonic probe. 4,930,512, Cl. 128-661.060.
Henry, D. Lindley. Thermal packaging assembly. 4,931,333, Cl. 428-76.000.
Henschel, Walter; Riesner, Manfred; and Kunstmann, Uwe, to Carl Schenck AG. Process and apparatus for spreading a chip web. 4,931,243, Cl. 264-109.000.
Henty, David L. Method for formation of high temperature superconductor films with reduced substrate heating. 4,931,424, Cl. 505-001.000.
Herberg, Helmut, to Siemens Aktiengesellschaft. Thyristor having increased dI/dt stability. 4,931,848, Cl. 357-23.400.
Herbst, Donald J.; Fay, Richard D.; Frericks, David L.; and Blair, Bruce A., to Lenco, Inc. Device for training welders. 4,931,018, Cl. 434-234.000.
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Danielssen, Tore; and Herfurth, Eike, 4,931,098, Cl. 106-638.000.
Hernandez, Walter C.; Page, Edward A.; and Lefler, Kenneth A., to Monitoring Technology Corporation. Method and apparatus for detecting gear defects. 4,931,949, Cl. 364-497.000.
Herold, Friedrich, to Hoechst Aktiengesellschaft. Filament-, fiber- or film-forming aromatic copolyamide from aromatic diamine mixture. 4,931,533, Cl. 528-185.000.
Herold, Heiko: *See*—
Uhlemann, Hans; Herold, Heiko; Boeck, Reinhard; and Daun, Hans, 4,931,174, Cl. 209-139.100.
Heron, John B., Jr., to Sprague Electric Company. Method for adjusting capacitor at manufacture and product. 4,931,901, Cl. 361-321.000.
Herrington, Leo P.: *See*—
Srinivasan, Kollengode V.; Herrington, Leo P.; Basaly, Mores A.; and Poulsen, Harold W., 4,931,151, Cl. 204-376.000.
Hertel, Richard J.: *See*—
Klos, Leo V.; and Hertel, Richard J., 4,931,776, Cl. 340-610.000.
Hettinga, Seibolt. Method for forming irrigation pipe having a porous side wall. 4,931,236, Cl. 264-41.000.
Hewlett-Packard Company: *See*—
Baldwin, Richard R., 4,930,894, Cl. 356-351.000.
Bray, Robert C.; Johnsen, Catherine A.; Bagwell, Timothy L.; and Ishak, Waguih S., 4,931,752, Cl. 333-151.000.
Cowger, Bruce; Nielsen, Niels J.; and Dion, John H., 4,931,811, Cl. 346-140.00R.
Dunn, John B. R.; McDaniel, Lowell R.; Shelley, Patrick W.; and Lewey, Karen M., 4,931,812, Cl. 346-140.00A.
Hadbawnik, Detlev; and Kraiczek, Karsten, 4,930,892, Cl. 356-328.000.
Pan, Alfred I.; Taub, Howard H.; and Levie, Harold W., 4,931,813, Cl. 346-140.00R.
Swedberg, Sally A., 4,931,328, Cl. 428-36.910.
Hi-Tek Polymers, Inc.: *See*—
Shimp, David A.; and Ising, Steven J., 4,931,545, Cl. 528-422.000.
Hibino, Sokichi: *See*—
Suzuki, Shinichi; Deguchi, Hiroyuki; Hamaoka, Takahiro; and Hibino, Sokichi, 4,930,995, Cl. 417-312.000.
Hickok, William K.: *See*—
Baumeister, Hans-Peter; Hickok, William K.; Bernstein, Lawrence J.; DiPietro, Matthew; and Hochreiter, William T., 4,931,883, Cl. 360-11.100.
Hieda, Teruo; Suzuki, Masao; and Narita, Hitoshi, to Canon Kabushiki Kaisha. Image sensing apparatus. 4,931,856, Cl. 358-29.000.
Higashino, Tateo: *See*—
Tosaka, Akio; Sakata, Kei; Hashiguchi, Koichi; Higashino, Tateo; and Ichida, Toshio, 4,931,106, Cl. 148-12.00C.
Higashisaka, Norio, to Mitsubishi Denki Kabushiki Kaisha. High speed logic circuit having output feedback. 4,931,669, Cl. 307-448.000.
Higgins, Joanne M.; and Mosehauer, Michael, to Eastman Kodak Company. Apparatus for monitoring developer mixture. 4,931,835, Cl. 355-203.000.
Hill, Douglas B.; and Newell, Fredrick J., Jr., to Demand Products, Inc. Sanding rasp. 4,930,267, Cl. 51-392.000.
Hill, Jerry M.: *See*—
Titsworth, Raymond; Lipe, J. Tom; Dale, James L.; Monroe, Hanford D.; and Hill, Jerry M., 4,931,964, Cl. 364-559.000.
Hill, Peter M. Foldable shelter. 4,930,534, Cl. 135-102.000.
Hill, Roger: *See*—
McNaught, William G.; and Hill, Roger, 4,930,676, Cl. 228-115.000.
Hillier Technologies Limited Partnership: *See*—
Simpson, Raymond W.; Chandler, Donald G.; and Bowers, John, 4,932,037, Cl. 375-1.000.
Hilti Aktiengesellschaft: *See*—
Noser, Martin; and Mark, Fritz, 4,930,585, Cl. 175-220.000.
Pfister, Norbert, 4,930,673, Cl. 227-10.000.
Hinshaw, Jerald C.: *See*—
Wardle, Robert B.; Hinshaw, Jerald C.; and Hajik, Robert M., 4,931,112, Cl. 149-88.000.
Hirai, Kiyofumi: *See*—
Hasegawa, Yoshinori; and Hirai, Kiyofumi, 4,931,796, Cl. 341-154.000.
Hirai, Tokuyuki: *See*—
Kugimiya, Shuzo; Fukumochi, Yoji; Nakamura, Ichiko; Hirai, Tokuyuki; and Suzuki, Hitoshi, 4,931,936, Cl. 364-419.000.
Hirami, Akira; and Taguchi, Yasuhiro, to Sharp Kabushiki Kaisha. Character entry device. 4,931,969, Cl. 364-709.150.
Hirano, Masato; and Tadokoro, Eiichi, to Fuji Photo Film Co., Ltd. Method of processing silver halide photographic materials where the rollers are intermittently rotated during stand-by. 4,931,378, Cl. 430-264.000.
Hirano, Tetsuji: *See*—
Inoue, Hiroshi; and Hirano, Tetsuji, 4,931,365, Cl. 428-458.000.
Hiraoka, Hiroshi: *See*—
Yamamoto, Yoshio; and Hiraoka, Hiroshi, 4,930,302, Cl. 57-281.000.
Hirobe, Yoshiaki: *See*—
Miyake, Katsuya; and Hirobe, Yoshiaki, 4,930,846, Cl. 303-111.000.
Hiroi, Masakazu: *See*—
Naito, Masataka; Honjo, Takeshi; Kobayashi, Kenji; Saito, Jun; Shido, Hironori; and Hiroi, Masakazu, 4,930,761, Cl. 270-53.000.
Hirose, Yoshiharu, to Shimadzu Corporation. Data correction circuit for position emission computed tomograph. 4,931,968, Cl. 364-571.020.
Hirota, Hajime: *See*—
Igarashi, Sahoko; Ogino, Hidekazu; and Hirota, Hajime, 4,931,216, Cl. 252-547.000.
Hirukawa, Shigeru: *See*—
Suwa, Kyoichi; Ushida, Kazuo; Suto, Takeshi; Kameyama, Masaomi; Hirukawa, Shigeru; and Nakamura, Shinichi, 4,931,830, Cl. 355-71.000.
Hiruma, Teruo; and Ohsuka, Shinji, to Hamamatsu Photonics Kabushiki Kaisha. Radiation imaging apparatus. 4,931,647, Cl. 250-368.000.
Hishiki, Teruo, to U.S. Philips Corporation. Circuit for measuring the capacity of a battery. 4,931,737, Cl. 324-431.000.
Hitachi Koki Co., Ltd.: *See*—
Watahiki, Shinichi; Itoh, Nobuhiko; and Miyasaka, Masao, 4,930,917, Cl. 400-690.000.
Hitachi, Ltd.: *See*—
Baba, Tsutomu; Kawamura, Fumio; Chino, Koichi; Tsuchiya, Kiroyuki; Kikuchi, Makoto; and Tamata, Shin, 4,931,222, Cl. 252-628.000.
Furukawa, Kenji; and Terashima, Kasetsugu, 4,931,208, Cl. 252-299.610.
Hara, Yasuhiko; and Endo, Kenzo, 4,930,890, Cl. 356-241.000.
Kageura, Kenichi, 4,931,924, Cl. 364-200.000.
Kasukabe, Susumu; Ookubo, Masasi; Akiba, Yutaka; Tanaka, Minoru; and Yokono, Hitoshi, 4,931,726, Cl. 324-158.00F.
Kokubu, Takemitsu; and Yoshioka, Hiroshi, 4,931,690, Cl. 313-407.000.
Mitsuishi, Naoki; Matsubara, Kiyoshi; Takamori, Yoh; and Ozawa, Yoshiyuki, 4,931,997, Cl. 365-218.000.
Ogino, Masanori, 4,931,703, Cl. 315-370.000.
Ohira, Eiji; and Komatsu, Akio, 4,931,935, Cl. 364-419.000.
Sonobe, Tadasi; Ueda, Shinjiro; Ikeguchi, Takashi; Matsumoto, Manabu; and Kuroishi, Kazuo, 4,931,744, Cl. 328-235.000.

Sugawara, Katuo; Takahashi, Akio; Katagiri, Junichi; Nagai, Akira; Ono, Masahiro; and Narahara, Toshikazu, 4,931,507, Cl. 525-193.000.
Tamiya, Toshihiko, 4,932,014, Cl. 369-48.000.
Tokunaga, Takafumi; Tsuneoka, Masatoshi; and Mizukami, Koichiro, 4,931,410, Cl. 437-189.000.
Uehara, Tetsuzou; Kokunishi, Motohide; Shimoi, Kenji; and Kagimasa, Hideko, 4,931,953, Cl. 364-518.000.

Hitachi Metals, Ltd.: *See*—
Ogata, Yasunobu; Kurihara, Koichiro; Masaka, Mitusuke; and Hatanaka, Kouji, 4,931,619, Cl. 219-270.000.

Hitachi Service Engineering, Ltd.: *See*—
Sonobe, Tadasi; Ueda, Shinjiro; Ikeguchi, Takashi; Matsumoto, Manabu; and Kuroishi, Kazuo, 4,931,744, Cl. 328-235.000.

Hix, Veldon M.: *See*—
Holm, David; Hix, Veldon M.; and Willard, Miles J., 4,931,303, Cl. 426-549.000.

Hiya Pharmaceutical Co., Ltd.: *See*—
Uji, Akira, 4,931,475, Cl. 514-729.000.

Hochreiter, William T.: *See*—
Baumeister, Hans-Peter; Hickok, William K.; Bernstein, Lawrence J.; DiPietro, Matthew; and Hochreiter, William T., 4,931,883, Cl. 360-11.100.

Hochsprung, Ronald: *See*—
Fitch, Jonathan; and Hochsprung, Ronald, 4,931,923, Cl. 364-200.000.

Hodara, Henri; and Braun, Steve W., to Honeywell Inc. Fiber optic seismic system. 4,932,004, Cl. 367-76.000.

Hoechst Aktiengesellschaft: *See*—
Dany, Franz-Josef; Klassen, Horst; Adrian, Renate; Prell, Hedwig; and Kalteyer, Gerhard, 4,931,272, Cl. 424-49.000.
Gerdau, Thomas; Kleiner, Hans-Jerg; Peuckert, Marcellus; Bruck, Martin; and Aldinger, Fritz, 4,931,513, Cl. 525-474.000.
Hammer, Klaus-Dieter; Winter, Hermann; and Buettner, Rolf, 4,930,545, Cl. 138-118.100.
Herold, Friedrich, 4,931,533, Cl. 528-185.000.
Mauz, Otto; Noetzel, Siegfried; and Sauber, Klaus, 4,931,476, Cl. 521-34.000.
Wegener, Peter; Feldhues, Michael; and Litterer, Heinz, 4,931,568, Cl. 549-6.000.

Hoechst Celanese Corporation: *See*—
Berner, Paul, 4,931,549, Cl. 534-557.000.
Johnson, Robert E., 4,931,100, Cl. 106-163.100.
Johnson, Robert E., 4,931,316, Cl. 427-227.000.
Mueller, Werner H.; Khanna, Dinesh N.; Vora, Rohitkumar H.; and Erckel, Ruediger J., 4,931,540, Cl. 528-353.000.
Spak, Mark A.; Mammato, Donald; Durham, Dana; and Jain, Sangya, 4,931,381, Cl. 430-325.000.

Hoechst Japan Limited: *See*—
Jitsukawa, Tomofumi, 4,931,400, Cl. 435-287.000.

Hoechst-Roussel Pharmaceuticals Inc.: *See*—
Effland, Richard C.; Klein, Joseph T.; Olsen, Gordon E.; and Davis, Larry, 4,931,457, Cl. 514-349.000.
Kim, Kwon H.; Henderson, Norman L.; and Chien, Yie W., 4,931,281, Cl. 424-448.000.

Hoelderich, Wolfgang; and Goetz, Norbert, to BASF Aktiengesellschaft. Preparation of cyanopyridines. 4,931,564, Cl. 546-286.000.

Hoelscher, Charles H.: *See*—
Haynes, Ronald L.; Hoelscher, Charles H.; and Lasch, Jonathan G., 4,931,220, Cl. 252-586.000.

Hoffman, Arthur J., III. Fiber optic splice assembly. 4,930,859, Cl. 350-96.210.

Hoffman, John R., to Brunswick Corporation. Method of playing a bowling game. 4,930,775, Cl. 273-37.000.

Hoffman, Paul S.; Helsel, Leta O.; Bibb, William F.; and McKinney, Roger M., to University of Tennesse Research Corporation, The. Monocional antibodies to legionella. 4,931,547, Cl. 530-387.000.

Hoffmann, Erwin: *See*—
Krippl, Kurt; Schulte, Klaus; Hoffmann, Erwin; and Wiedermann, Rolf, 4,931,480, Cl. 521-99.000.

Hoffmann-La Roche Inc.: *See*—
Barbier, Pierre; Schneider, Fernand; and Widmer, Ulrich, 4,931,463, Cl. 514-422.000.
Klaus, Michael; Loeliger, Peter; and Weiser, Harald, 4,931,458, Cl. 514-354.000.
Manchand, Percy S.; and Micheli, Robert A., 4,931,574, Cl. 549-405.000.

Hoffmanns, Frederic: *See*—
Caron, John L.; and Hoffmanns, Frederic, 4,930,754, Cl. 256-65.000.

Hofmeister, Klaus: *See*—
Muller, Erich R.; Schmidt, Gunther; and Hofmeister, Klaus, 4,931,117, Cl. 156-89.000.

Hogsett, Russell J.: *See*—
Brown, Robert D.; Hogsett, Russell J.; Compton, Richard A.; and Swisher, Thomas W., 4,930,621, Cl. 198-831.000.

Hojima, Toshinari: *See*—
Takahashi, Yasuo; and Hojima, Toshinari, 4,930,191, Cl. 24-20.00R.

Holbrook, Russell W.; Kulpa, Walter J.; and Morabito, James, to Pitney Bowes Inc. Front end feeder for mail handling machine. 4,930,764, Cl. 271-119.000.

Holenstein, Robert J. Ellipsoidal-like ball. 4,930,777, Cl. 273-65.0EC.

Holland, Donald R.; and Robertson, David W., to Eli Lilly and Company. Antiarrhythmic method. 4,931,470, Cl. 514-619.000.

Holloway, Thomas C.: *See*—
Tigelaar, Howard L.; Haken, Roger A.; Holloway, Thomas C.; and Groover, Robert, III, 4,931,411, Cl. 437-192.000.

Holly Farms Foods, Inc.: *See*—
Whittington, Jackie T., 4,930,187, Cl. 17-11.000.

Holm, David; Hix, Veldon M.; and Willard, Miles J., to Willard, Miles J. Method for controlling the surface bubbling of fabricated snack products. 4,931,303, Cl. 426-549.000.

Holmes, William A.; and Costa, Peter F., to EndoTherapeutics. Trocar assembly with improved latch. 4,931,042, Cl. 604-164.000.

Holter, Heinz; and Rump, Hanns, to Holter, Heinz. Sensing system for controlling air circulation valves in motor vehicles. 4,930,407, Cl. 98-2.010.

Holtzinger, Charles R.: *See*—
Ralph, George A.; and Holtzinger, Charles R., 4,932,069, Cl. 318-809.000.

Holzner, Charles R., Sr., to Steiner Company, Inc. Breathing device for soap dispenser. 4,930,667, Cl. 222-189.000.

Holzner, Charles R., Sr., to Steiner Company, Inc. Air freshener. 4,931,224, Cl. 261-30.000.

Hom, Harvey K. Y., to Microwave Components and Systems, Inc. Microwave power amplifier. 4,931,747, Cl. 330-286.000.

Honda Giken Kogyo Kabushiki: *See*—
Yamamoto, Tohru; Takeo, Tadashi; Ichinose, Kiyohiro; Ozawa, Syogo; Fujii, Kenji; Fujii, Saburo; Enomoto, Mashayuki; Ishibashi, Ichiro; and Murayama, Junichi, 4,931,322, Cl. 427-421.000.

Honda Giken Kogyo Kabushiki Kaisha: *See*—
Aihara, Yasuyuki; Baba, Shigeki; Akiyama, Eitetsu; and Sawada, Tatsumi, 4,930,460, Cl. 723-41.490.
Ide, Yutaka; and Hasiguchi, Makoto, 4,930,320, Cl. 62-184.000.
Mori, Sanae; Sakamoto, Masaaki; Wada, Takuo; Mizuno, Yoshikazu; and Sato, Masakazu, 4,930,910, Cl. 384-276.000.
Ogawa, Sumitaka; and Hayashi, Tatsuo, 4,931,940, Cl. 364-431.030.

Honda Giken Kogyo Kabushiki Kaisha & Stanley Electric Co.: *See*—
Takahashi, Fumitaka; Okazaki, Kunio; Shiraishi, Masaru; Takahashi, Masayuki; Obara, Kazufumi; Yorinoto, Koji; and Tanabe, Tohru, 4,930,349, Cl. 73-497.000.

Honda, Kazuki: *See*—
Saiki, Syuji; Sato, Kazue; and Honda, Kazuki, 4,930,596, Cl. 181-152.000.

Honda, Michitaka; and Ema, Takehiro, to Kabushiki Kaisha Toshiba. Image storage system and method of storing images such that they are displayed with gradually increasing resolution. 4,931,954, Cl. 364-518.000.

Honeywell Inc.: *See*—
Hancock, William R., 4,931,801, Cl. 342-185.000.
Hodara, Henri; and Braun, Steve W., 4,932,004, Cl. 367-76.000.
Maglic, Rastko C., 4,930,929, Cl. 403-29.000.

Hongo, Toshio, to Maru Kikai Kogyo Co., Ltd. Apparatus for exchanging tool for bending machine. 4,930,332, Cl. 72-446.000.

Honjo, Masahiro, to Matsushita Electric Industrial Co., Ltd. Waveform improving apparatus. 4,931,858, Cl. 358-37.000.

Honjo, Takeshi: *See*—
Naito, Masataka; Honjo, Takeshi; Kobayashi, Kenji; Saito, Jun; Shido, Hironori; and Hiroi, Masakazu, 4,930,761, Cl. 270-53.000.

Hoover Group, Inc.: *See*—
Voorhies, John J., 4,930,661, Cl. 220-465.000.

Hori, Takahiro: *See*—
Takakura, Makoto; Hori, Takahiro; Sakaguchi, Yuriko; and Nakamura, Yuji, 4,931,314, Cl. 427-140.000.

Horii, Yoshiyuki; and Oishi, Koji, to Horizon International, Inc. Paper feeding apparatus. 4,930,763, Cl. 271-31.000.

Horikawa, Yoshiaki, to Olympus Optical Co., Ltd. Surface structure measuring apparatus. 4,930,896, Cl. 356-376.000.

Horinek, Herbert J.: *See*—
Berryman, Leslie N.; Horinek, Herbert J.; Phillippi, Max L.; Prucha, David A.; Reidenbach, Vincent G.; and Stephenson, Stanley V., 4,930,576, Cl. 166-308.000.

Horita, Yoshiyuki: *See*—
Terada, Yasuharu; Horita, Yoshiyuki; and Ishii, Susumu, 4,930,323, Cl. 70-68.000.

Horiuchi, Takao; Arai, Izumi; and Tahara, Yoshifumi, to Tokyo Electron Limited. Etching method and etching apparatus. 4,931,135, Cl. 156-643.000.

Horizon International, Inc.: *See*—
Horii, Yoshiyuki; and Oishi, Koji, 4,930,763, Cl. 271-31.000.

Horizons International Foods, Inc.: *See*—
Shanbhag, Sudhakar; and Cousminer, Joseph J., 4,931,298, Cl. 426-296.000.
Shanbhag, Sudhakar P.; and Cousminer, Joseph J., 4,931,296, Cl. 426-243.000.

Horn, Alan S.; Jerabek, Paul A.; and Peck, James V., to Nelson Research & Development. Method for detecting dopaminergic diseases using fluorine-18 radiolabelled D_2 dopamine receptor ligands. 4,931,270, Cl. 424-1.100.

Horng, Wen-Jenn. Radiant air-sterilizing apparatus. 4,931,654, Cl. 250-436.000.

Hornlein, Robert W.: *See*—
Broadwin, Alan; Vassallo, Charles; Logan, Joseph N.; and Hornlein, Robert W., 4,931,047, Cl. 604-22.000.

Horovitz, Zola P.: *See*—
Sudilovsky, Abraham; and Horovitz, Zola P., 4,931,430, Cl. 514-19.000.

Horrobin, David F., to Efamol Limited. Pharmaceutical and dietary composition. 4,931,468, Cl. 514-560.000.

Hoshino, Akira; Saji, Mikio; and Fujii, Shigeaki, to Dainichiseika Color & Chemicals Mfg. Co., Ltd. Deordorizing sheet with a deodorizing coating formulation. 4,931,360, Cl. 428-328.000.

Hoshino, Seiichi: *See*—
Akabane, Hidemitsu; Isobe, Toshimi; and Hoshino, Seiichi, 4,930,567, Cl. 165-25.000.

Hosogai, Setsuo: *See*—
Toda, Haruhisa; Fujiwara, Kouhei; Hosogai, Setsuo; and Shioguchi, Kazumi, 4,931,602, Cl. 200-144.00R.

Hosoi, Hisataka; Endo, Hozumi; Ando, Tatsuo; and Shoji, Mamoru, to Mitsubishi Kasei Corporation. Alumina fiber structure and process for its production. 4,931,239, Cl. 264-63.000.

Hosoi, Yuichi; Takahashi, Kenji; and Arakawa, Satoshi, to Fuji Photo Film Co., Ltd. Radiation image read-out apparatus. 4,931,642, Cl. 250-327.200.

Hotchkiss, Calvin J.; and Hotchkiss, Nancy E., to Pac-Rim Trading Company, Inc. Jewelry display book. 4,930,635, Cl. 206-495.000.

Hotchkiss, Nancy E.: *See*—
Hotchkiss, Calvin J.; and Hotchkiss, Nancy E., 4,930,635, Cl. 206-495.000.

Houben, Marie-Christine: *See*—
Cao, Hoai-Chau; and Houben, Marie-Christine, 4,931,195, Cl. 252-8.800.

Household Manufacturing, Inc.: *See*—
Ament, Myron J., 4,930,167, Cl. 4-420.000.
Khanna, Jai K.; Silvey, Norman G.; and Williams, Charles D., 4,930,978, Cl. 415-58.300.

Houshi, Teruo: *See*—
Nagasawa, Naobumi; Houshi, Teruo; and Arai, Hiroyuki, 4,932,018, Cl. 369-59.000.

Houston, Kevin C. D.; and Popil, Roman E., to MacMillan Bloedel Limited. On-line texture sensing. 4,931,657, Cl. 250-559.000.

Houston, Theodore W., to Texas Instruments, Incorporated. Bit line latch sense amp. 4,932,002, Cl. 365-241.000.

Hovis, Edward E.; Johnson, Eric D.; and Schroeder, Michael J., to Applied Extrusion Technologies, Inc. Extruded ethylenic polymer foam containing both open and closed cells. 4,931,484, Cl. 521-143.000.

Howard, Robin G., to Denny Bros. Printing Limited. Adhesive lable or leaflet assemblies. 4,930,812, Cl. 281-5.000.

Howtek, Inc.: *See*—
Nowak, Michael T.; and Demers, Michael L., 4,931,095, Cl. 106-22.000.

Hrushesky, William J. M. Sinus arrhythmia monitor. 4,930,518, Cl. 128-671.000.

Hshieh, Fwu-Iuan, to Siliconix Incorporated. Method of fabricating a short-channel low voltage DMOS transistor. 4,931,408, Cl. 437-44.000.

Hua, Mei: *See*—
Vince, Robert; and Hua, Mei, 4,931,559, Cl. 544-276.000.

Huang, Alan: *See*—
Brenner, Karl-Heinz; Huang, Alan; and Lohmann, Adolf W., 4,931,959, Cl. 364-525.000.

Huang, Kan-Chi. Polishing device. 4,930,264, Cl. 51-170.00T.

Hubbell Incorporated: *See*—
Gartland, Albert J., Jr.; and Lawlor, Michael J., 4,931,024, Cl. 439-856.000.
Quiogue, Honesto D., 4,931,914, Cl. 362-265.000.
Quiogue, Honesto D., 4,931,915, Cl. 362-267.000.

Hubele, Adolf, to Ciba-Geigy Corporation. Pesticides. 4,931,560, Cl. 544-315.000.

Huels Troisdorf AG: *See*—
Barfurth, Dieter; Lindzus, Claus; and Nestler, Heinz, 4,931,094, Cl. 106-20.000.

Huerlimann, Peter: *See*—
Angeloz, Corinne; Huerlimann, Peter; and Van Meir, Eugene, 4,930,690, Cl. 222-490.000.

Huggins, George R.: *See*—
Cutler, Winnifred B.; Preti, George; and Huggins, George R., 4,931,403, Cl. 436-65.000.

Huggins, Raymond W., to Boeing Company, The. Two wavelength optical sensor and sensing system. 4,931,636, Cl. 250-226.000.

Hughes Aircraft Company: *See*—
Dimitrijevic, Peter; Skidmore, Mark; and Fishkin, Theodore S., 4,932,075, Cl. 455-226.000.
Hyder, Jerry D., 4,931,952, Cl. 364-517.000.
Wen, Cheng P.; and Hennegan, Richard T., 4,931,799, Cl. 342-110.000.

Hughes, William L.; and Manning, Harold J. Induction heated rotary kiln. 4,931,610, Cl. 219-10.491.

Huisinga, Richard D., to Willmar Poultry Company, Inc. Methods for controlling poultry barn environments. 4,930,446, Cl. 119-21.000.

Hull, Ezekiel H.; and Frappier, Edward P., to Morflex Chemical Company, Inc. Citrate esters. 4,931,583, Cl. 560-180.000.

Hull, Scott: *See*—
Manitt, James; and Hull, Scott, 4,931,323, Cl. 427-53.100.

Huls Aktiengesellschaft: *See*—
Jadamus, Hans; Ribbing, Wilfried; and Feinauer, Roland, 4,931,504, Cl. 525-68.000.

Hulterstrum, Harold D.; and Luck, Thomas R., to K Enterprises, Inc. Apparatus for making tactile impressions on paper. 4,930,914, Cl. 400-122.000.

Hundt, Gary W., to Essex Environmental Industries, Inc. Triple seal molded outlet for plastic storage container. 4,930,648, Cl. 220-1.00B.

Hune, Ronald G., to Thermal Designs, Inc. Apparatus and process for mixing and dispensing high viscosity, multiple component reactive liquids into a mold. 4,931,249, Cl. 264-279.100.

Hunt, Edwin S., to DEI Enterprises. Low wear articulated buoy. 4,930,924, Cl. 403-24.000.

Hunter, Bryan D. Optical flip-flop. 4,930,873, Cl. 350-354.000.

Hunter Douglas Inc.: *See*—
Goodman, Barry I., 4,930,562, Cl. 160-236.000.

Hunter, Gary R. Dual action (function) integral target rifle. 4,930,239, Cl. 42-42.010.

Hunter, Gerald D.: *See*—
Pearman, A. Noel J.; Hunter, Gerald D.; and Woessner, Michael A., 4,930,488, Cl. 126-39.00E.

Hunter, Murray, to Jackel International Pty. Ltd. Pump assembly for air mattress. 4,930,174, Cl. 5-454.000.

Hunter, Scott R.: *See*—
Hamm, Robert N.; Hunter, Scott R.; Hurst, George S.; Turner, James E.; and Wright, Harvel A., 4,931,653, Cl. 250-385.100.

Huon, Pierre: *See*—
Glaise, Rene J.; and Huon, Pierre, 4,931,985, Cl. 364-900.000.

Huor, Ou H.: *See*—
Sakamoto, Nobuyoshi; and Huor, Ou H., 4,931,755, Cl. 333-193.000.

Hurlburt, Joseph C., to Ford New Holland, Inc. Hydraulic cylinder mode shift. 4,930,295, Cl. 56-10.900.

Hurst, George S.: *See*—
Hamm, Robert N.; Hunter, Scott R.; Hurst, George S.; Turner, James E.; and Wright, Harvel A., 4,931,653, Cl. 250-385.100.

Husky Injection Molding Systems Ltd.: *See*—
Schad, Robert D.; and Brown, Paul P., 4,931,234, Cl. 264-40.100.

Husted, Royce. Directionally controlled hydraulic cylinder. 4,930,403, Cl. 91-443.000.

Hutchins, Willie R. Coil spring compressing tool. 4,930,751, Cl. 254-10.500.

Hutchinson: *See*—
Busnel, Rene-Guy; and Argy, Gilles, 4,930,522, Cl. 128-844.000.
Poirier, Jean, 4,930,758, Cl. 269-292.000.

Hutt, Peter R.; and Day, Stephen, to Polymeters Response International Limited. Electronic electricity meters. 4,931,725, Cl. 324-142.000.

Hutton, Melvin, to Cego Limited. Window stay cap member. 4,930,185, Cl. 16-325.000.

Hwang, Feng-Lin. Portable sirening and illumination device. 4,931,913, Cl. 362-103.000.

Hwang, Hak S., to Goldstar Co., Ltd. Cassette loading device for VCR. 4,930,720, Cl. 242-198.000.

Hwang, Long-Shi, to Kyooh Precision Industry Co., Ltd. Musical toy tumbler. 4,931,029, Cl. 446-396.000.

Hyde, Silas G. Sportsman's game and fish cleaning station. 4,930,188, Cl. 17-44.300.

Hyder, Jerry D., to Hughes Aircraft Company. Target association method. 4,931,952, Cl. 364-517.000.

Hygeia Sciences, Incorporated: *See*—
Block, Elliott; Bahar, Izak; Cole, Frank; Eaton, Cheryl A.; Jones, Wendy; Sigillo, Eric; Coseo, Mary; Cicia, Nancy J.; Cannon, L. Edward; and Cantarow, Walter, 4,931,385, Cl. 435-7.000.

Ichida, Toshio: *See*—
Tosaka, Akio; Sakata, Kei; Hashiguchi, Koichi; Higashino, Tateo; and Ichida, Toshio, 4,931,106, Cl. 148-12.00C.

Ichikoh Industries, Ltd.: *See*—
Yoshida, Norio, 4,930,370, Cl. 74-502.100.

Ichinose, Kiyohiro: *See*—
Yamamoto, Tohru; Takeo, Tadashi; Ichinose, Kiyohiro; Ozawa, Syogo; Fujii, Kenji; Fujii, Saburo; Enomoto, Mashayuki; Ishibashi, Ichiro; and Murayama, Junichi, 4,931,322, Cl. 427-421.000.

ICI Americas Inc.: *See*—
Baker, Don R.; Walker, Francis H.; and Brownell, Keith H., 4,931,451, Cl. 514-335.000.
Broadhurst, Michael D.; and Cromartie, Thomas H., 4,931,448, Cl. 514-351.000.

ICU Medical, Inc.: *See*—
Lopez, George A., 4,931,048, Cl. 604-110.000.

Ide, Fumito: *See*—
Abuyama, Yasuo; Ide, Fumito; Hamanaka, Osamu; and Sanbayashi, Takeshi, 4,931,837, Cl. 355-245.000.

Ide, Yutaka; and Hasiguchi, Makoto, to Honda Giken Kogyo Kabushiki Kaisha. Cooling fan controlling apparatus for vehicle with air conditioner. 4,930,320, Cl. 62-184.000.

Idel, Karsten: *See*—
Pakull, Ralf; Eckhardt, Volker; Genz, Joachim; Idel, Karsten; Kricheldorf, Hans-Rytger; and Doring, Volker, 4,931,534, Cl. 528-193.000.

Idemitsu Petrochemical Company, Limited: *See*—
Tsuchida, Eishun; Nishide, Hiroyuki; Yamamoto, Kimihisa; and YHoshida, Shu, 4,931,542, Cl. 528-373.000.

Idriss, Samir F., to Shiley Infusaid Inc. Constant pressure variable flow pump. 4,931,050, Cl. 604-891.100.

Igarashi, Sahoko; Ogino, Hidekazu; and Hirota, Hajime, to Kao Corporation. Detergent composition comprising an anionic or amphoteric surface active agent and a branched quaternary ammonium salt. 4,931,216, Cl. 252-547.000.

Ihara Chemical Industry Co., Ltd.: *See*—
Shigematsu, Masahiro; Ohi, Hideo; Kusano, Shoji; Miyazawa, Takeshige; Takahashi, Satoru; Toyokawa, Yasuhumi; and Kajiwara, Ikuo, 4,931,087, Cl. 71-93.000.

Ihara, Masaru: *See*—
Kimura, Takafumi; Yamawaki, Hideki; Ikeda, Kazuto; and Ihara, Masaru, 4,931,425, Cl. 505-1.000.

Iida, Giichi: *See*—
Masuda, Isao; and Iida, Giichi, 4,930,467, Cl. 123-179.00P.

Iida, Shigehira; Arai, Takayoshi; Hashizume, Junichiro; Takei, Tetsuya; and Saitoh, Keishi, to Canon Kabushiki Kaisha. Microwave plasma CVD apparatus having an improved microwave transmissive window. 4,930,442, Cl. 118-723.000.

Iida, Youichi: *See*—
Koshizawa, Toshifumi; Yamaguchi, Satoshi; Yoshimura, Hiroshi; and Iida, Youichi, 4,930,594, Cl. 180-179.000.

Iimuro, Shigeru; Morimoto, Yoshio; and Kitamura, Takashi, to Mitsui Toatsu Chemicals, Inc. Process for obtaining high-purity bisphenol A. 4,931,146, Cl. 203-92.000.

Iiyama, Katsuaki: *See*—
Tamai, Shoji; Ohta, Masahiro; Kawashima, Saburo; Iiyama, Katsuaki; Oikawa, Hideaki; and Yamaguchi, Akihiro, 4,931,531, Cl. 528-172.000.

Iizuka, Hiroshi: *See*—
Kakiuchi, Shizuo; and Iizuka, Hiroshi, 4,931,724, Cl. 324-103.00P.

Iizuka, Yo; Iwasaki, Takao; Katto, Takayuki; and Shiiki, Zenya, to Kureha Kagaku Kogyo Kabushiki Kaisha. Process for producing polyarylene sulfide in titanium vessel with addition of water. 4,931,516, Cl. 526-62.000.

Ikeda, Kazuto: *See*—
Kimura, Takafumi; Yamawaki, Hideki; Ikeda, Kazuto; and Ihara, Masaru, 4,931,425, Cl. 505-1.000.

Ikeda, Yasushi: *See*—
Saito, Osamu; Iwano, Kazuko; and Ikeda, Yasushi, 4,930,839, Cl. 297-338.000.

Ikeda, Yoshiaki; and Mitsuru, Kuwasawa, to Fanuc Ltd. NC unit processing method. 4,931,709, Cl. 318-567.000.

Ikeguchi, Takashi: *See*—
Sonobe, Tadasi; Ueda, Shinjiro; Ikeguchi, Takashi; Matsumoto, Manabu; and Kuroishi, Kazuo, 4,931,744, Cl. 328-235.000.

Ikematsu, Takeshi; Hattori, Yasuo; Inoki, Yoshihiro; and Tanaka, Mitsuhiro, to Asahi Kasei Kogyo Kabushiki Kaisha. Crystalline transbutadiene polymers. 4,931,376, Cl. 526-164.000.

Ikemoto, Yutaka: *See*—
Nakanishi, Yasuhiro; Ikemoto, Yutaka; and Suzuki, Takashi, 4,930,222, Cl. 374-170.000.

Ikeuchi, Satoru: *See*—
Akimoto, Kunio; Ikeuchi, Satoru; and Takizawa, Yoshio, 4,931,375, Cl. 430-109.000.

Ilardi, Leonora M.: *See*—
Madison, Stephen A.; and Ilardi, Leonora M., 4,931,563, Cl. 546-222.000.

Illinois Tool Works, Inc.: *See*—
Meier, Terrence P., 4,930,324, Cl. 70-18.000.
Watts, Leslie M., 4,931,627, Cl. 219-548.000.

Imaginative Research Associates, Inc.: *See*—
Ramirez, Jose E.; and Vishnupad, Mohan, 4,931,204, Cl. 252-167.000.

Imaizumi, Eiji: *See*—
Kano, Mitsuru; Miyagawa, Kenji; Yamaguchi, Masahiko; and Imaizumi, Eiji, 4,930,877, Cl. 350-339.00F.

Imedex: *See*—
Tardy, Michel; and Tayot, Jean-Louis, 4,931,546, Cl. 530-356.000.

Immenkeppel, Michael: *See*—
Kleinstuck, Roland; Lemch, Cornelia; Immenkeppel, Michael; Block, Hans-Dieter; and Odenbach, Herbert, 4,931,586, Cl. 562-24.000.

Imperial Chemeical Industries, plc: *See*—
Wright, Paul B.; and Ward, Mary V., 4,930,179, Cl. 15-230.110.

Imperial Chemical Industries PLC: *See*—
Clough, John M.; and Godfrey, Christopher R. A., 4,931,438, Cl. 514-241.000.
Elliott, Raymond, 4,931,082, Cl. 71-92.000.
Quayle, Arthur; and Stead, Cecil V., 4,931,550, Cl. 534-724.000.
Ramshaw, Colin, 4,931,166, Cl. 204-212.000.
Wilson, Donald, 4,931,085, Cl. 71-92.000.

In-Ve-Nit International Inc.: *See*—
Starexina, Stjepan; and Rowe, John A., 4,930,278, Cl. 52-315.000.

Inaba, Yutaka: *See*—
Inoue, Hiroshi; Osada, Yoshiyuki; and Inaba, Yutaka, 4,930,875, Cl. 350-333.000.

Inata, Hiroo: *See*—
Matsumura, Shunichi; Inata, Hiroo; Umetani, Hiroyuki; and Okada, Masuhiro, 4,931,512, Cl. 525-333.300.

Indiana Carton Corp.: *See*—
Petty, James C., 4,930,629, Cl. 206-185.000.

Industria Chimica Profarmaco S.p.A.: *See*—
Piselli, Fulvio L., 4,931,587, Cl. 562-401.000.

Industrial Conveyor Co., Inc.: *See*—
Johnson, Thomas A.; and McDonald, Larry V., 4,930,623, Cl. 198-465.100.

Industrial Energy Corporation: *See*—
Paull, James B., 4,930,571, Cl. 165-111.000.

Industrial Machine Development Manufacturing, Inc.: *See*—
Lindberg, Verne L., 4,930,616, Cl. 198-463.600.

Industrial Technology Research Institute: *See*—
Shyu, Jia-Ming; and Chuang, Ching-Wang, 4,931,930, Cl. 364-424.010.

Ingersoll-Rand Company: *See*—
Vanderjagt, John A., 4,930,702, Cl. 239-157.000.

Inoki, Yoshihiro: *See*—
Ikematsu, Takeshi; Hattori, Yasuo; Inoki, Yoshihiro; and Tanaka, Mitsuhiro, 4,931,376, Cl. 526-164.000.

Inou, Kiyoharu; Koide, Yoshiaki; and Iwata, Yasunobu, to Yokogawa Electric Corporation. Ringing choke converter. 4,931,918, Cl. 363-19.000.

Inoue, Hideo: *See*—
Yamanoue, Kouichi; Akita, Shigeyuki; Tanaka, Hiroaki; Sugitani, Tatsuo; and Inoue, Hideo, 4,931,727, Cl. 324-172.000.

Inoue, Hiroshi; Osada, Yoshiyuki; and Inaba, Yutaka, to Canon Kabushiki Kaisha. Scanning driver circuit for ferroelectric liquid crystal device. 4,930,875, Cl. 350-333.000.

Inoue, Hiroshi; and Hirano, Tetsuji, to Ube Industries, Ltd. Aromatic polyimide film having metallic surface. 4,931,365, Cl. 428-458.000.

Inoue, Takakatsu: *See*—
Ohtsuki, Tomonari; Inoue, Takakatsu; and Tanaka, Yoshiaki, 4,931,622, Cl. 235-487.000.

Inoue, Takashi: *See*—
Takase, Hiroshi; Goto, Hisashi; Inoue, Takashi; Sakurai, Hidenori; and Kimura, Akiteru, 4,930,881, Cl. 350-445.000.

Inoue, Yoshio; and Yaginuma, Atsushi, to Shin-Etsu Chemical Co., Ltd. Organopolysiloxane compositon. 4,931,485, Cl. 521-154.000.

Insley, Thomas L: *See*—
Krueger, Dennis L.; Insley, Thomas L; Meyer, Daniel E.; and Rolando, Richard J., 4,931,230, Cl. 264-6.000.

Institut Francais du Petrole: *See*—
Delignieres, Robert, 4,932,006, Cl. 367-134.000.

Institut Merieux: *See*—
Tardy, Michel; and Tayot, Jean-Louis, 4,931,546, Cl. 530-356.000.

Institut Textile de France: *See*—
Bourgeois, Michel; Chatelin, Roger; and Wattiez, Daniel, 4,931,577, Cl. 556-123.000.

Institute of Physical & Chemical Research, The: *See*—
Miya, Shinya; Yoshimura, Takashi; Mise, Takaya; and Yamazaki, Hiroshi, 4,931,417, Cl. 502-117.000.

Integrated Device Technology, Inc.: *See*—
Ngoc, Danh Le; and Mick, John R., 4,931,974, Cl. 364-736.000.

Inter Innovation LeFebure Mfg. Corp.: *See*—
Willey, Clair L.; and Ayer, David H., 4,930,941, Cl. 406-10.000.

Interatom GmbH: *See*—
Jager, Walter; and Schreiber, Dietmar, 4,930,574, Cl. 166-266.000.

InterCon Systems, Inc.: *See*—
Neidich, Douglas A., 4,931,022, Cl. 439-310.000.

International Business Machines Corporation: *See*—
Anschel, Morris; and Pawlowski, Walter P., 4,931,310, Cl. 427-55.000.
Bruner, David A., 4,931,606, Cl. 200-517.000.
Brunsvold, William R.; Conley, Willard E.; Crockatt, Dale M.; and Iwamoto, Nancy E., 4,931,379, Cl. 430-270.000.
Cook, Peter W.; and Montoye, Robert K., 4,931,970, Cl. 364-715.080.
Cook, Peter W.; and Montoye, Robert K., 4,931,971, Cl. 364-715.080.
Geyer, Joel Erwin; Lee, Joseph K.; Norman, Vernon R.; and Wilson, Kenneth T., 4,932,023, Cl. 370-85.400.
Glaise, Rene J.; and Huon, Pierre, 4,931,985, Cl. 364-900.000.
Hegde, Suryanarayan G.; Scranton, Robert A.; and Yarmchuk, Edward J., 4,931,887, Cl. 360-75.000.
Klueh, David R.; Morris, Jack W.; Urdahl, Kent G.; and Zimmer, Matthew K., 4,931,348, Cl. 428-207.000.
Rhodes, Joseph C., Jr.; Moore, Victor S.; Kraft, Wayne R.; and Barrs, John W., 4,931,989, Cl. 364-900.000.

International Healthcare Products, Inc.: *See*—
Frantz, Ronald F., 4,930,171, Cl. 5-450.000.

International Medical, Inc.: *See*—
Wetterman, Peter H., 4,931,037, Cl. 604-8.000.

International Paper Company: *See*—
Gordon, Robert L.; Rehm, Robert E.; and Sosnowski, Robert, 4,930,682, Cl. 229-123.300.

Inventio AG: *See*—
Brenner, Richard, 4,930,603, Cl. 187-125.000.

IPCO Corporation: *See*—
Mayer, Stanley E., 4,930,532, Cl. 134-184.000.

Iqbal, Abul: *See*—
Surber, Werner; Iqbal, Abul; and Stern, Christian, 4,931,566, Cl. 548-453.000.

IRECO Incorporated: *See*—
McKenzie, Lee F.; and Lawrence, Lawrence D., 4,931,110, Cl. 149-2.000.

Iryo, Takeaki; Kubota, Satoshi; Sano, Yoshio; Murata, Yoshishige; and Koinuma, Yasumi, to Nippon Oil and Fats Co., Ltd.; and Seiko Epson Corp. Synthetic resin lens. 4,930,879, Cl. 350-409.000.

Isao, Ohsonishi: *See*—
Yoshifumi, Murata; Teruhisa, Kaneda; Kazuo, Hara; Katsunori, Takamoto; Isao, Ohsonishi; and Shinichi, Yokota, 4,931,538, Cl. 528-292.000.

Iseki & Co. Ltd.: *See*—
Ishimaru, Takeshi; Kishi, Takeshi; and Yoshino, Shigeo, 4,930,743, Cl. 248-638.000.

Ishak, Waguih S.: *See*—
Bray, Robert C.; Johnsen, Catherine A.; Bagwell, Timothy L.; and Ishak, Waguih S., 4,931,752, Cl. 333-151.000.

Ishibashi, Ichiro: *See*—
Yamamoto, Tohru; Takeo, Tadashi; Ichinose, Kiyohiro; Ozawa, Syogo; Fujii, Kenji; Fujii, Saburo; Enomoto, Mashayuki; Ishibashi, Ichiro; and Murayama, Junichi, 4,931,322, Cl. 427-421.000.

Ishida, Masamitsu: *See*—
Adachi, Yuuma; Nakajima, Nobuyoshi; and Ishida, Masamitsu, 4,931,644, Cl. 250-327.200.
Ishida, Masato: *See*—
Takeda, Hiroaki; Ishida, Masato; Abe, Eiichi; and Sato, Isamu, 4,931,882, Cl. 358-474.000.
Ishida, Tokuji: *See*—
Hamada, Masataka; Ishida, Tokuji; and Akada, Yasuaki, 4,931,821, Cl. 354-402.000.
Ishido, Setsuko: *See*—
Fujisawa, Mutsuo; Kameda, Tsutomu; Katsura, Hirofumi; Yamaga, Reiichi; and Ishido, Setsuko, 4,931,096, Cl. 106-35.000.
Ishiguro, Hirohide: *See*—
Uchimura, Shoji; Amano, Hironobu; Ohta, Kazuhiro; Ishiguro, Hirohide; Matsumoto, Takehiko; and Ito, Takuya, 4,931,242, Cl. 264-87.000.
Ishiguro, Mamoru; and Kawai, Akira, to Mitsubishi Paper Mills Limited. No-carbon pressure-sensitive copying paper. 4,931,422, Cl. 503-214.000.
Ishihara, Kosei. Lever-type auto body dent puller. 4,930,335, Cl. 72-451.000.
Ishii, Hiroaki: *See*—
Sato, Yukio; Wataya, Masafumi; Ishii, Hiroaki; and Udagawa, Yutaka, 4,931,815, Cl. 346-154.000.
Ishii, Kimio, to Shinagawa Diecasting Co., Ltd. Charge forming apparatus. 4,931,226, Cl. 261-41.500.
Ishii, Satoshi: *See*—
Nishimura, Tetsuharu; Tsukiji, Masaaki; Ishii, Satoshi; and Ishizuka, Koh, 4,930,895, Cl. 356-356.000.
Ishii, Susumu: *See*—
Terada, Yasuharu; Horita, Yoshiyuki; and Ishii, Susumu, 4,930,323, Cl. 70-68.000.
Ishii, Takatoshi, to Ascii Corporation. Display apparatus. 4,931,785, Cl. 340-703.000.
Ishii, Yoshiyasu: *See*—
Takahashi, Takehiko; Ishii, Yoshiyasu; and Matsuda, Hiroaki, 4,930,697, Cl. 224-275.000.
Ishikawa, Isao: *See*—
Matsuoka, Masahiro; Akimoto, Keiichi; Sumita, Takeshi; Tomosada, Tsuyoshi; and Ishikawa, Isao, 4,931,483, Cl. 521-137.000.
Ishikawa, Shozo: *See*—
Matsumoto, Masakazu; Ishikawa, Shozo; Ando, Wataru; Kikuchi, Toshihiro; and Yamazaki, Itaru, 4,931,371, Cl. 430-59.000.
Ishimaru, Takeshi; Kishi, Takeshi; and Yoshino, Shigeo, to Iseki & Co. Ltd. Vibration proofing support structure for engine of vehicle. 4,930,743, Cl. 248-638.000.
Ishimizu, Hideaki: *See*—
Kikuchi, Hiroshi; Tanuma, Jiro; Ishimizu, Hideaki; and Kasai, Tadashi, 4,930,915, Cl. 400-175.000.
Ishiwata, Koji; and Tobita, Satoru, to Sony Corporation. Method of constructing and recording list of recorded data in postscript type optical disk. 4,931,927, Cl. 364-300.000.
Ishiwatari, Takahiko: *See*—
Takagi, Hiroshi; Ohmi, Kazuaki; Sugata, Masao; Tsuda, Hisanori; and Ishiwatari, Takahiko, 4,931,692, Cl. 313-503.000.
Ishizaka, Kouichi, to Jidosha Kiki Co., Ltd. Method of measuring vehicle speed. 4,931,966, Cl. 364-565.000.
Ishizuka, Koh: *See*—
Nishimura, Tetsuharu; Tsukiji, Masaaki; Ishii, Satoshi; and Ishizuka, Koh, 4,930,895, Cl. 356-356.000.
Ising, Steven J.: *See*—
Shimp, David A.; and Ising, Steven J., 4,931,545, Cl. 528-422.000.
Isle, Brian A.; Bloom, Charles P.; Butler, Arch W.; and Spoor, David, to Electric Power Research Institute. Multimedia interface and method for computer system. 4,931,950, Cl. 364-513.000.
Isobe, Minoru, to Oki Electric Industry Co., Ltd. Printer for simultaneously forming planographic printing surfaces and printing ink images. 4,930,417, Cl. 101-465.000.
Isobe, Mitsuo: *See*—
Matsui, Masataka; Tsujimoto, Jun-ichi; Ootani, Takayuki; and Isobe, Mitsuo, 4,931,994, Cl. 365-189.010.
Isobe, Toshimi: *See*—
Akabane, Hidemitsu; Isobe, Toshimi; and Hoshino, Seiichi, 4,930,567, Cl. 165-25.000.
Isobe, Yoshinori: *See*—
Fukaya, Masaki; Kawakami, Soichiro; Itabashi, Satoshi; Terada, Katsunori; Gofuku, Ihachiro; Nakagawa, Katsumi; Hatanaka, Katsunori; Isobe, Yoshinori; Saika, Toshihiro; Kaneko, Tetsuya; Kitahara, Nobuko; and Suzuki, Hideyuki, 4,931,661, Cl. 250-578.100.
ISPRA - Isreal Product Research Co. Ltd.: *See*—
Bialy, Jacob, 4,930,242, Cl. 42-105.000.
Israel, Ganot: *See*—
Croitoriu, Natan; Dror, Jacob; Goldenberg, Ephraim; Mendelovic, David; and Israel, Ganot, 4,930,863, Cl. 350-96.320.
Isuzu Motors Limited: *See*—
Koshizawa, Toshifumi; Yamaguchi, Satoshi; Yoshimura, Hiroshi; and Iida, Youichi, 4,930,594, Cl. 180-179.000.
Itabashi, Satoshi: *See*—
Fukaya, Masaki; Kawakami, Soichiro; Itabashi, Satoshi; Terada, Katsunori; Gofuku, Ihachiro; Nakagawa, Katsumi; Hatanaka, Katsunori; Isobe, Yoshinori; Saika, Toshihiro; Kaneko, Tetsuya; Kitahara, Nobuko; and Suzuki, Hideyuki, 4,931,661, Cl. 250-578.100.
Ito, Hideki, to Nissan Motor Company, Limited. Control for load carrier for industrial vehicle. 4,930,975, Cl. 414-635.000.
Ito, Kunihiro: *See*—
Kojima, Shinji; Matsukawa, Toshitane; Mizota, Hisakazu; Yuhara, Susumu; Yoshimoto, Yoshio; Fujimura, Toshio; and Ito, Kunihiro, 4,930,207, Cl. 29-527.500.
Ito, Masahiko: *See*—
Murata, Shinji; and Ito, Masahiko, 4,930,721, Cl. 242-200.000.
Ito, Naraо: *See*—
Okabayashi, Mitsumasa; and Ito, Naraо, 4,931,955, Cl. 64-519.000.
Ito, Shinichi, to Fuji Electric Co., Ltd. Darlington-connected semiconductor device. 4,931,666, Cl. 307-315.000.
Ito, Takuya: *See*—
Uchimura, Shoji; Amano, Hironobu; Ohta, Kazuhiro; Ishiguro, Hirohide; Matsumoto, Takehiko; and Ito, Takuya, 4,931,242, Cl. 264-87.000.
Itoh, Nobuhiko: *See*—
Watahiki, Shinichi; Itoh, Nobuhiko; and Miyasaka, Masao, 4,930,917, Cl. 400-690.000.
Itoh, Nobuyuki: *See*—
Nakajima, Hiroomi; Itoh, Nobuyuki; and Nihira, Hiroyuki, 4,931,409, Cl. 437-63.000.
Itoh, Susumu; Satoh, Kazuo; and Sakuma, Tomonori, to Akebono Brake Industry Co., Ltd. Centerless grinding apparatus of through-feed type. 4,930,260, Cl. 51-103.0TF.
ITT Corporation: *See*—
Zoller, Jon P., 4,931,605, Cl. 200-408.000.
ITW-Fastex Italia, S.p.A.: *See*—
Oddenino, Manrico, 4,930,540, Cl. 137-599.100.
ItW New Zealand Limited: *See*—
Beach, Allan D.; and Brunton, John S., 4,930,870, Cl. 350-97.000.
Iwamoto, Nancy E.: *See*—
Brunsvold, William R.; Conley, Willard E.; Crockatt, Dale M.; and Iwamoto, Nancy E., 4,931,379, Cl. 430-270.000.
Iwanari, Yoshiyuki: *See*—
Amaya, Shinji; Iwanari, Yoshiyuki; Shinzo, Kinji; Kogawara, Toshiro; Yamazaki, Syuuichi; Shimizu, Seiichi; and Kuriyama, Kazuya, 4,931,370, Cl. 430-45.000.
Iwano, Kazuko: *See*—
Saito, Osamu; Iwano, Kazuko; and Ikeda, Yasushi, 4,930,839, Cl. 297-338.000.
Iwasaki Electric Co., Ltd.: *See*—
Yoshida, Yasuo; Kakinuma, Tadashi; Sakurai, Tadashi; Kishima, Yoshio; and Kinugasa, Hirofumi, 4,931,655, Cl. 250-492.100.
Iwasaki, Takao: *See*—
Iizuka, Yo; Iwasaki, Takao; Katto, Takayuki; and Shiiki, Zenya, 4,931,516, Cl. 526-62.000.
Iwata, Kazuo; Nishiwaki, Osamu; and Tochihara, Shinichi, to Canon Kabushiki Kaisha. Ink-jet recording system. 4,931,810, Cl. 346-1.100.
Iwata, Yasunobu: *See*—
Inou, Kiyoharu; Koide, Yoshiaki; and Iwata, Yasunobu, 4,931,918, Cl. 363-19.000.
Iwata, Yoshihisa, to Kabushiki Kaisha Toshiba. Semiconductor sense amplifier. 4,931,675, Cl. 307-530.000.
IXYS Corporation: *See*—
Zommer, Nathan, 4,931,844, Cl. 357-23.400.
J. I. Case Company: *See*—
Leidecker, Henry A.; and Woerman, Gary R., 4,930,601, Cl. 184-6.120.
J & M Home Products, Inc.: *See*—
Martin, Danny T.; and Schreiner, Jim G., 4,930,281, Cl. 52-514.000.
J.M. Voith GmbH: *See*—
Eckhard, Martin, 4,930,437, Cl. 118-410.000.
Steiner, Karl; Mullner, Josef; Schiel, Christian; and Flamig, Hans, 4,931,142, Cl. 162-358.000.
Jackel International Pty. Ltd.: *See*—
Hunter, Murray, 4,930,174, Cl. 5-454.000.
Jackson, Melvin R., to General Electric Company. Nb-Ti-Al-Hf-Cr alloy. 4,931,254, Cl. 420-426.000.
Jackson, Robert J., to Opcon Incorporated. Long range, thru-beam photoelectric alignment indicator. 4,931,631, Cl. 250-221.000.
Jackson, Scott C., to Du Pont de Nemours, E. I., and Company. Touch screen overlay with improved conductor durability. 4,931,782, Cl. 340-706.000.
Jacob, Adir. Apparatus for dry sterilization of medical devices and materials. 4,931,261, Cl. 422-292.000.
Jacobson, Mark, to M.L.S. Detroit, Inc. Tool holder. 4,930,947, Cl. 408-153.000.
Jacoff, Daniel, to Great Neck Saw Manufacturers, Inc. Utility knife. 4,930,218, Cl. 30-162.000.
Jacques, Roland: *See*—
Hatkevitz, Zvi; Maylor, Ken; and Jacques, Roland, 4,931,134, Cl. 156-630.000.
Jadamus, Hans; Ribbing, Wilfried; and Feinauer, Roland, to Huls Aktiengesellschaft. Thermoplastic compositions based on polyphenylene ethers and styrene-butadiene polymers produced by emulsion polymerization. 4,931,504, Cl. 525-68.000.
Jadatz, Harald B., to Slater Electric Inc. Mounting arrangement for electrical wiring devices having non-metallic mounting strap. 4,930,960, Cl. 411-188.000.
Jadvar, Hossein: *See*—
Metzger, William T.; and Jadvar, Hossein, 4,930,521, Cl. 128-786.000.
Jaecklin, Felix P. Wall with gravity support structure, building element and method for construction thereof. 4,930,939, Cl. 405-262.000.

Jaeger, Helmut: *See*—
Auchter, Gerhard; Schwerzel, Thomas; Osterloh, Rolf; Neubert, Gerhard; Pfoehler, Peter; Druschke, Wolfgang; and Jaeger, Helmut, 4,931,494, Cl. 524-460.000.

Jaeger, Hugh D.; and Hawley, James M. Toy blimp. 4,931,028, Cl. 446-225.000.

Jaeger, Karl-Friedrich: *See*—
Kersten, Siegfried; Jaeger, Karl-Friedrich; Koenig, Karl-Heinz; Mueller, Albrecht; Pawliczek, Josef B.; Recker, Hans-Gert; Rohr, Wolfgang; and Wigger, August, 4,931,466, Cl. 514-490.000.

Jaeger, Richard J., *Jr.*: *See*—
Baral, Elliott; Brown, Percy B.; Hauptman, Reuben D.; Jaeger, Richard J., Jr.; LaPorta, Frank C.; Lauber, Pamela J.; LeCronier, Richard E.; Nelson, Randall H.; Russell, Thomas L., Jr.; and Ying, Wen-Ping, 4,932,042, Cl. 379-67.000.

Jaffa, David, to Artwave America Inc. Apparatus and method for three-dimensional screen printing. 4,930,413, Cl. 101-126.000.

Jagelid, Kjell-inge G. Device for mounting door frames, window frames and similar objects at an adjustable distance from a support structure. 4,930,959, Cl. 411-107.000.

Jager, Walter; and Schreiber, Dietmar, to Interatom GmbH. Method for tertiary oil recovery from deep-well drill holes with utilization of the escaping petroleum gas. 4,930,574, Cl. 166-266.000.

Jain, Sangya: *See*—
Spak, Mark A.; Mammato, Donald; Durham, Dana; and Jain, Sangya, 4,931,381, Cl. 430-325.000.

Jalbert, Domina C. Built-in control flaps for a multi-cell wing type canopy. 4,930,726, Cl. 244-90.00R.

Jamieson, Jerel S.: *See*—
Gleason, Henry A., III; and Jamieson, Jerel S., 4,931,975, Cl. 364-570.000.

Janezich, Robert J.; Cedar, Charles E.; and Dosen, Todd G., to L and M Radiator, Inc. Heat exchanger. 4,930,568, Cl. 165-76.000.

Jang, Hyo Keun, to SKC Limited. Cover-locking device for a video tape cassette. 4,930,821, Cl. 292-228.000.

Jansen, Klaas: *See*—
Becker, Rainer; Eckhardt, Heinz; Eggersdorfer, Manfred; Schindler, Gerhard; and Jansen, Klaas, 4,931,428, Cl. 512-25.000.

Janssen Pharmaceutica N.V.: *See*—
Van Wauwe, Jean P. F.; Heeres, Jan; and Backx, Leo J. J., 4,931,444, Cl. 514-252.000.

Japan Synthetic Rubber Co., Ltd.: *See*—
Sakai, Masato; Umeda, Itsuki; Takeuchi, Yasuo; and Takemura, Yasuhiko, 4,931,499, Cl. 525-194.000.

Jarrett, Robert: *See*—
Gray, Randall C.; and Jarrett, Robert, 4,931,717, Cl. 323-299.000.

Jean-Luc, Andre, to Lohr Industrie. Short coupling with variable geometry for trailers. 4,930,800, Cl. 280-446.100.

Jech, Joseph, *Jr.*: *See*—
McColgin, William C.; Brust, Thomas B.; Daly, Robert C.; Jech, Joseph, Jr.; and Lindholm, Robert D., 4,931,351, Cl. 430-323.000.

Jeffrey, A. K.; Marsh, David J.; and Collins, Philip L., to Schlumberger Technologies, Inc. Automatic test system having a "true tester-per-pin" architecture. 4,931,723, Cl. 371-22.300.

Jenks, William C. Magnetic particle inspection apparatus with enhanced uniformity of magnetization. 4,931,731, Cl. 324-216.000.

Jenoptik Jena GmbH: *See*—
Bergner, Joachim; Danz, Rainer; and Heinz, Hartmut, 4,930,878, Cl. 350-394.000.

Jensen, Gary L.: *See*—
Czirr, J. Bart; and Jensen, Gary L., 4,931,649, Cl. 250-390.070.

Jensen-Korte, Uta; Schallner, Otto; Stetter, Jorg; Becker, Benedikt; Behrenz, Wolfgang; Stendel, Wilhelm; and Andrews, Peter, to Bayer Aktiengesellschaft. Pesticidal substituted 5-methylamino-1-aryl-pyrazoles. 4,931,461, Cl. 514-404.000.

Jensen, Niels D.; and Christensen, Jorgen, to Grundfos International a/s. Immersion pump assembly. 4,930,996, Cl. 417-373.000.

Jerabek, Paul A.: *See*—
Horn, Alan S.; Jerabek, Paul A.; and Peck, James V., 4,931,270, Cl. 424-1.100.

Jestadt, Albrecht: *See*—
Wolf, Jurgen; Jestadt, Albrecht; Heintke, Hans E.; and Odemer, Michael, 4,930,217, Cl. 30-43.920.

Jidosha Kiki Co., Ltd.: *See*—
Ishizaka, Kouichi, 4,931,966, Cl. 364-565.000.
Ogata, Yasunobu; Kurihara, Koichiro; Masaka, Mitsuke; and Hatanaka, Kouji, 4,931,619, Cl. 219-270.000.
Shimamura, Morihiko; Kamono, Shinobu; Okuyama, Junichi; Okano, Kunio; and Komine, Naoki, 4,930,607, Cl. 192-1.330.

Jincks, Danny C.; and Latta, Michael D., to Public Safety Equipment, Inc. Multicolor emergency vehicle light. 4,931,768, Cl. 340-473.000.

Jines, Michael D.: *See*—
Krumholz, Frank C.; and Jines, Michael D., 4,930,277, Cl. 52-263.000.

Jitsukawa, Tomofumi, to Hoechst Japan Limited. Deivce for pouring washing water onto muti-well plates. 4,931,400, Cl. 435-287.000.

Jobert, Pierre P.: *See*—
Gally, Daniel; and Jobert, Pierre P., 4,931,693, Cl. 313-528.000.

Joh. Enschede En Zonen Grafische Inrichting B.V.: *See*—
Nusmeier, Hendrik W., 4,930,814, Cl. 283-109.000.

Johenning, John B., to Strata Flotation, Inc. Waterbed corner structure and method. 4,930,172, Cl. 5-451.000.

Johns, Robert R. Fish hook for flies. 4,930,249, Cl. 43-43.160.

Johnsen, Catherine A.: *See*—
Bray, Robert C.; Johnsen, Catherine A.; Bagwell, Timothy L.; and Ishak, Waguih S., 4,931,752, Cl. 333-151.000.

Johnsen, Thore. Independent band spring door gear motor operator. 4,931,708, Cl. 318-466.000.

Johnson Electric Industrial Manufactory Limited: *See*—
Wang, Patrick S., 4,930,210, Cl. 29-597.000.

Johnson, Eric D.: *See*—
Hovis, Edward E.; Johnson, Eric D.; and Schroeder, Michael J., 4,931,484, Cl. 521-143.000.

Johnson, Jeffrey C., to Haden, Inc. Apparatus for messuring and controlling fluid flow across a boundary. 4,930,343, Cl. 73-196.000.

Johnson, Joel C.; and Harris, Richard S., to Electro Scientific Industries, Inc. Method of and apparatus for modulating a laser beam. 4,930,901, Cl. 372-26.000.

Johnson, Joseph L.; and Skinner, George W., to Aqualon Company. High gloss cellulose tablet coating. 4,931,286, Cl. 424-480.000.

Johnson, Robert E., to Hoechst Celanese Corp. Boron-containing preceramic blend and fiber formed therefrom. 4,931,100, Cl. 106-163.100.

Johnson, Robert E., to Hoechst Celanese Corp. Preparation of interstitial titanium ceramic fibers. 4,931,316, Cl. 427-227.000.

Johnson, Sam E. Gun muzzle brake. 4,930,396, Cl. 89-14.300.

Johnson, Samuel V. Auxiliary tool handle. 4,930,181, Cl. 16-110.00R.

Johnson Service Company: *See*—
Gleason, Henry A., III; and Jamieson, Jerel S., 4,931,975, Cl. 364-570.000.

Johnson, Thomas A.; and McDonald, Larry V., to Industrial Conveyor Co., Inc. Conveyor system and integral one-piece extended guide-track. 4,930,623, Cl. 198-465.100.

Johnson, William J.: *See*—
Martenson, Alfred J.; and Johnson, William J., 4,931,211, Cl. 252-378.00R.

Joliat, Jack J.: *See*—
Hayward, Alan G.; Gregg, Lauri C.; Dutrisac, Aurele L.; and Joliat, Jack J., 4,930,595, Cl. 181-104.000.

Jolliffee, Michael J. A. H. Concrete connector. 4,930,677, Cl. 228-120.000.

Jones, Keith A., to Berkley, Inc. Method of determining attractant preference of fish. 4,930,363, Cl. 73-865.700.

Jones, Robert D.: *See*—
Romberger, John A.; Jones, Robert D.; and Carr, Richard P., 4,931,318, Cl. 427-397.700.

Jones, Wallace R. Fuel treatment device. 4,930,483, Cl. 123-538.000.

Jones, Wendy: *See*—
Block, Elliott; Bahar, Izak; Cole, Frank; Eaton, Cheryl A.; Jones, Wendy; Sigillo, Eric; Coseo, Mary; Cicia, Nancy J.; Cannon, L. Edward; and Cantarow, Walter, 4,931,385, Cl. 435-7.000.

Jordan, Rodney B. Portable putting waffle green. 4,930,784, Cl. 273-178.00B.

Joshi, Chandrashekhar H.: *See*—
Burnett, Sibley C.; Purcell, John R.; Creedon, William P.; and Joshi, Chandrashekhar H., 4,930,314, Cl. 60-517.000.

Jost, Hermann J.: *See*—
Haffer, Dieter; and Jost, Hermann J., 4,931,341, Cl. 428-81.000.

Jouillat, Claude: *See*—
Brunet, Michel; Di Giovanni, Patrick; Jouillat, Claude; Lina, Jean-Pierre; and Pennaneac'h, Herve , 4,930,999, Cl. 417-552.000.

Jovanovic, Milan; Farrington, Richard; and Lee, Fred C. Constant frequency zero-voltage-switching multi-resonant converter. 4,931,716, Cl. 323-285.000.

Jozewicz, Wojciech: *See*—
Rochelle, Gary T.; and Jozewicz, Wojciech, 4,931,264, Cl. 423-242.000.

Juenkersfeld, Harald, to Benz & Hilgers GmbH. Device for sealing foil covers onto containers, particularly plastic cups. 4,930,288, Cl. 53-329.000.

Juhlke, Timothy J.: *See*—
Bierschenk, Thomas R.; Juhlke, Timothy J.; Lagow, Richard J.; and Kawa, Hajimu, 4,931,199, Cl. 252-68.000.

Juki Corporation: *See*—
Okabayashi, Mitsumasa; and Ito, Narao, 4,931,955, Cl. 64-519.000.
Yamamoto, Yuji, 4,930,432, Cl. 112-292.000.

Julemont, Jean, to Colgate-Palmolive Company. Wiping cloth for cleaning non-abrasive surfaces. 4,931,201, Cl. 252-91.000.

Jung, Louis; and Robert, Dominique, to Universite Louis Pasteur. Amides of paramethoxycinnamic and utilization thereof as solar filters. 4,931,471, Cl. 514-622.000.

Justice, Samuel P.: *See*—
Goff, Larry; King, Lawrence A.; Barnett, Daniel B.; and Justice, Samuel P., 4,931,745, Cl. 330-9.000.

K Enterprises, Inc.: *See*—
Hulterstrum, Harold D.; and Luck, Thomas R., 4,930,914, Cl. 400-122.000.

Kabat, Daniel M.; and Fontichiaro, Dominic, to Ford Motor Company. Composite engine block. 4,930,470, Cl. 123-195.00R.

Kabayama, Mineaki: *See*—
Suzuki, Takeshi; and Kabayama, Mineaki, 4,931,289, Cl. 424-690.000.

Kabushiki Kaisha Kaisha Toshiba: *See*—
Aoyama, Michishige, 4,930,899, Cl. 366-98.000.

Kabushiki Kaisha Kanesaka Gijutsu Kenkyusho: *See*—
Kanesaka, Hiroshi, 4,930,315, Cl. 60-600.000.

Kabushiki Kaisha Kojima Shohten: *See*—
Matsui, Kazuhiro, 4,930,931, Cl. 403-231.000.

Kabushiki Kaisha Kyoto Daiichi Kagaku: *See*—
Yamao, Yasuo; and Fujioka, Shigeru, 4,931,387, Cl. 435-25.000.
Kabushiki Kaisha Tokyo Kikai Seisakusho: *See*—
Kawabata, Takanobu; and Harada, Noritake, 4,930,416, Cl. 101-364.000.
Kabushiki Kaisha Toshiba: *See*—
Abuyama, Yasuo; Ide, Fumito; Hamanaka, Osamu; and Sanbayashi, Takeshi, 4,931,837, Cl. 355-245.000.
Aoki, Masayuki, 4,931,609, Cl. 219-10.55B.
Baba, Tatsuro; Kanda, Ryoichi; and Seo, Yasutsugu, 4,930,514, Cl. 128-661.090.
Dobashi, Yoshitomi; and Yamamoto, Rikio, 4,931,685, Cl. 313-15.000.
Hanawa, Masatoshi, 4,931,733, Cl. 324-318.000.
Hashizume, Hiroshi, 4,931,876, Cl. 358-300.000.
Honda, Michitaka; and Ema, Takehiro, 4,931,954, Cl. 364-518.000.
Iwata, Yoshihisa, 4,931,675, Cl. 307-530.000.
Kamijo, Hiroyuki; and Mikata, Yuuichi, 4,931,405, Cl. 437-12.000.
Kamitake, Takashi; Kawamura, Shin-ichi; and Abe, Masahiro, 4,931,979, Cl. 364-745.000.
Maeda, Takeo; and Makita, Koji, 4,931,407, Cl. 437-45.000.
Matsui, Masataka; Tsujimoto, Jun-ichi; Ootani, Takayuki; and Isobe, Mitsuo, 4,931,994, Cl. 365-189.010.
Nakajima, Hiroomi; Itoh, Nobuyuki; and Nihira, Hiroyuki, 4,931,409, Cl. 437-63.000.
Nakamura, Koichiro; and Tanaka, Yoshinori, 4,931,623, Cl. 235-488.000.
Nakayama, Yasunobu; and Sato, Yasuji, 4,932,043, Cl. 379-157.000.
Obata, Yoshimori; and Toko, Makoto, 4,931,972, Cl. 364-724.130.
Ogihara, Masaki; Okada, Yoshio; and Fujii, Syuso, 4,931,992, Cl. 365-189.110.
Ohuchi, Masayuki; Oodaira, Hirosi; and Yoshida, Kenichi, 4,931,853, Cl. 357-74.000.
Ootani, Takayuki; and Matsui, Masataka, 4,931,998, Cl. 365-230.010.
Osafune, Koji, 4,931,889, Cl. 360-78.070.
Suga, Takayuki, 4,931,834, Cl. 355-200.000.
Takagi, Shiro; and Sato, Minoru, 4,931,957, Cl. 364-521.000.
Tomioka, Kazuhiko, 4,931,406, Cl. 437-27.000.
Utsumi, Tohru; and Sasaki, Tohru, 4,931,925, Cl. 364-200.000.
Kabushiki Kaisha Toyoda Jidoshokki Seisakusho: *See*—
Suzuki, Shinichi; Deguchi, Hiroyuki; Hamaoka, Takahiro; and Hibino, Sokichi, 4,930,995, Cl. 417-312.000.
Kadar, Ivan, to Grumman Aerospace Corporation. Method and apparatus for detecting innovations in a scene. 4,931,868, Cl. 358-105.000.
Kaeser, James A.: *See*—
Ahmed, Fahim U.; Buck, Charles E.; Camara, Michael A.; Cush, James F., Jr.; and Kaeser, James A., 4,931,203, Cl. 252-99.000.
Kagami, Akiyasu; and Hase, Takashi, to Kasei Optonix, Ltd. Phosphors and fluorescent compositions for emission of light under low-velocity electron excitation and fluorescent display devices utilizing the same. 4,931,651, Cl. 250-484.100.
Kagawa, Minoru; and Matsuzawa, Akira, to Matsushita Electric Industrial Co., Ltd. Folding circuit and serial-type A/D converter. 4,931,797, Cl. 341-162.000.
Kageura, Kenichi, to Hitachi, Ltd. Data transfer speed control apparatus capable of varying speed of data transfer between devices having different transfer speeds. 4,931,924, Cl. 364-200.000.
Kagimasa, Hideko: *See*—
Uehara, Tetsuzou; Kokunishi, Motohide; Shimoi, Kenji; and Kagimasa, Hideko, 4,931,953, Cl. 364-518.000.
Kahn, Walter K., to Anro Engineering, Inc. Optical fiber intrusion location sensor for perimeter protection of precincts. 4,931,771, Cl. 340-556.000.
Kaito, Takashi: *See*—
Sato, Mitsuyoshi; Kaito, Takashi; and Nakagawa, Yoshitomo, 4,930,439, Cl. 118-723.000.
Kajiwara, Ikuo: *See*—
Shigematsu, Masahiro; Ohi, Hideo; Kusano, Shoji; Miyazawa, Takeshige; Takahashi, Satoru; Toyokawa, Yasuhumi; and Kajiwara, Ikuo, 4,931,087, Cl. 71-93.000.
Kakinami, Toshiaki; and Hamajima, Shigemitsu, to Aisin Seiki Kabushiki Kaisha. Distance detector mounted on vehicle. 4,931,937, Cl. 364-424.010.
Kakinuma, Tadashi: *See*—
Yoshida, Yasuo; Kakinuma, Tadashi; Sakurai, Tadashi; Kishima, Yoshio; and Kinugasa, Hirofumi, 4,931,655, Cl. 250-492.100.
Kakiuchi, Shizuo; and Iizuka, Hiroshi, to Pioneer Electronic Corporation. Digital level indicating device. 4,931,724, Cl. 324-103.00P.
Kako, Hajime, to Mitsubishi Denki Kabushiki Kaisha. Fuel control apparatus for engines. 4,930,482, Cl. 123-488.000.
Kakuta, Nobuyuki: *See*—
Yoshitake, Kunitoshi; Tsujita, Yoshihiro; and Kakuta, Nobuyuki, 4,930,694, Cl. 224-42.45R.
Kaleta, Gary S.: *See*—
Saxton, Gregory J.; and Kaleta, Gary S., 4,930,426, Cl. 105-355.000.
Kalmijn, Hilco T.: *See*—
Kemner, Rudolf; and Kalmijn, Hilco T., 4,931,734, Cl. 324-318.000.
Kalnes, Tom N., to UOP. Process for refractory compound rejection from a hydrocracker recycle liquid. 4,931,165, Cl. 208-100.000.
Kalsi, Bhupinder S.: *See*—
Reichmann, Charles; and Kalsi, Bhupinder S., 4,930,923, Cl. 401-278.000.
Kalteyer, Gerhard: *See*—
Dany, Franz-Josef; Klassen, Horst; Adrian, Renate; Prell, Hedwig; and Kalteyer, Gerhard, 4,931,272, Cl. 424-49.000.
Kam, John B.: *See*—
Dev, Roger H.; Steinberg, Gabriel; Kam, John B.; and Comer, Stewart A., 4,932,026, Cl. 370-94.100.
Kamata, Yoshikiyo, to Kioritz Corporation. Separated lubrication type two-cycle internal combustion engine system. 4,930,462, Cl. 123-73.0AD.
Kameda, Tsutomu: *See*—
Fujisawa, Mutsuo; Kameda, Tsutomu; Katsura, Hirofumi; Yamaga, Reiichi; and Ishido, Setsuko, 4,931,096, Cl. 106-35.000.
Kamei, Ryosuke: *See*—
Tanaka, Toyoaki; Ohira, Katuzi; Nakamura, Akira; Kamei, Ryosuke; and Hashimoto, Akihiro, 4,931,005, Cl. 425-83.100.
Kamei, Sadao: *See*—
Morigaki, Masakazu; Kawagishi, Toshio; Nakazyo, Kiyoshi; Seto, Nobuo; and Kamei, Sadao, 4,931,382, Cl. 430-512.000.
Kameyama, Masaomi: *See*—
Suwa, Kyoichi; Ushida, Kazuo; Suto, Takeshi; Kameyama, Masaomi; Hirukawa, Shigeru; and Nakamura, Shinichi, 4,931,830, Cl. 355-71.000.
Kamijo, Hiroyuki; and Mikata, Yuuichi, to Kabushiki Kaisha Toshiba. Method for manufacturing a semiconductor device and suppressing the generation of bulk microdefects near the substrate surface layer. 4,931,405, Cl. 437-12.000.
Kamio, Kunimasa: *See*—
Takagishi, Hisao; Kanagawa, Shuichi; Kamio, Kunimasa; and Sumiyoshi, Kazuo, 4,931,515, Cl. 525-504.000.
Kamitake, Takashi; Kawamura, Shin-ichi; and Abe, Masahiro, to Kabushiki Kaisha Toshiba. Adding apparatus having a high accuracy. 4,931,979, Cl. 364-745.000.
Kamiya, Takashi; Saito, Yoshihisa; Teraji, Tsutomu; Nakaguit, Osamu; Oku, Teruo; Nakamura, Hitoshi; and Hashimoto, Masashi, to Fujisawa Pharmaceutical Company, Ltd. Disulfide substituted oxazetidine derivatives. 4,931,555, Cl. 540-222.000.
Kamo, Makoto; and Nakajima, Isamu, to Minolta Camera Kabushiki Kaisha. Internal pressure adjusting mechanism for underwater and waterproof products. 4,931,816, Cl. 354-64.000.
Kamono, Shinobu: *See*—
Shimamura, Morihiko; Kamono, Shinobu; Okuyama, Junichi; Okano, Kunio; and Komine, Naoki, 4,930,607, Cl. 192-1.330.
Kamprath, Axel; and Weyandt, Johannes, to Dr. Ing. h.c.F. Porsche AG. Oil pan for an internal combustion engine. 4,930,469, Cl. 123-195.00C.
Kanagawa, Shuichi: *See*—
Takagishi, Hisao; Kanagawa, Shuichi; Kamio, Kunimasa; and Sumiyoshi, Kazuo, 4,931,515, Cl. 525-504.000.
Kanai, Naritoshi; and Suzuki, Akira, to Aisin Seiki Kabushiki Kaisha. Intra-aortic balloon pump. 4,931,036, Cl. 600-18.000.
Kanai, Seita: *See*—
Takata, Naoto; Kanai, Seita; Araki, Nobuhiro; and Udo, Tadashi, 4,930,805, Cl. 280-690.000.
Kanamaru, Mitsutaka: *See*—
Nakashima, Mitsuyoshi; Kanamaru, Mitsutaka; Sugiyama, Akira; and Terakawa, Masato, 4,931,440, Cl. 514-259.000.
Kanda, Ryoichi: *See*—
Baba, Tatsuro; Kanda, Ryoichi; and Seo, Yasutsugu, 4,930,514, Cl. 128-661.090.
Kandala, Anatoly I.: *See*—
Chernyak, Zinovy A.; Tsvetkov, Alexandr A.; Onischenko, Alexandr M.; Kandala, Anatoly I.; Khrapov, Valery G.; Nusuparov, Georgy M.; Slavinsky, Vladimir M.; Geikhman, Isaak L.; Onelchenko, Nikolai P.; Rafalovich, Boris A.; Silaev, Viktor I.; and Zhdanov, Konstantin F., 4,931,638, Cl. 250-253.000.
Kanegafuchi Kagaku Kogyo Kabushiki Kaisha: *See*—
Shiiki, Hitoshi; Tada, Minoru; and Nakamura, Kyoichi, 4,931,477, Cl. 521-58.000.
Kaneko, Kiyoshi; Tanaka, Atsushi; Yoshimura, Yuichiro; Kobayashi, Katsuyuki; and Tanlishi, Shinnosuke, to Canon Kabushiki Kaisha. Coordinates input apparatus. 4,931,965, Cl. 364-560.000.
Kaneko, Tetsuya: *See*—
Fukaya, Masaki; Kawakami, Soichiro; Itabashi, Satoshi; Terada, Katsunori; Gofuku, Ihachiro; Nakagawa, Katsumi; Hatanaka, Katsunori; Isobe, Yoshinori; Saika, Toshihiro; Kaneko, Tetsuya; Kitahara, Nobuko; and Suzuki, Hideyuki, 4,931,661, Cl. 250-578.100.
Kanesaka, Hiroshi, to Usui Kokusai Sangyo Kabushiki Kaisha; and Kabushiki Kaisha Kanesaka Gijutsu Kenkyusho. Turbo-charger engine system. 4,930,315, Cl. 60-600.000.
Kano, Mitsuru; Miyagawa, Kenji; Yamaguchi, Masahiko; and Imaizumi, Eiji, to Alps Electric Co., Ltd. Liquid crystal display. 4,930,877, Cl. 350-339.00F.
Kanzaki Paper Manufacturing Company, Ltd.: *See*—
Yagi, Hisanori; Hamada, Kousuke; Nakano, Isamu; and Nishimura, Yoshihiro, 4,931,359, Cl. 428-325.000.
Kanzaki Seishi Company: *See*—
Matsumoto, Mitsuo, 4,931,127, Cl. 156-361.000.
Kao Corporation: *See*—
Igarashi, Sahoko; Ogino, Hidekazu; and Hirota, Hajime, 4,931,216, Cl. 252-547.000.
Kaplan, Robert H.; LaCava, Alberto; Shirley, Arthur I.; and Ringo, Steven M., to BOC Group, Inc., The. Method for densely packing molecular sieve adsorbent beds in a PSA system. 4,931,071, Cl. 55-25.000.
Kapp, Joseph A. Method and apparatus for fatigue and fracture testing of large caliber cannons. 4,930,391, Cl. 89-1.100.

Karacsonyi, Bela: *See*—
Pelyva, Jeno ; Soptei, Csaba; Kolonics, Zoltan; Karacsonyi, Bela; Balint, Sandor; Benczik, Janosne ; Kayos, Csaba; Lendvai, Laszlo ; and Laszlo, Sandor, 4,931,585, Cl. 562-17.000.

Karakal Corp. of the Americas: *See*—
Sines, Randy D.; and Farber, Bruce W., 4,930,782, Cl. 273-73.00D.

Karas, Joel; and Collins, Thomas J., to Keptel, Inc. Telephone network interface apparatus. 4,932,051, Cl. 379-399.000.

Karash, Karl; and Bentzen, Steen, to GenRad, Inc. Self-protecting power bus testing system. 4,931,742, Cl. 324-541.000.

Karim, Aziz A.: *See*—
Bunshah, Rointan F.; Desphandey, Chandra V.; and Karim, Aziz A., 4,931,158, Cl. 204-192.290.

Karppanen, Heikki; and Karppanen, Pirjo L., to Pharmaconsult Oy. Mixture of salts and uses of the mixture. 4,931,305, Cl. 426-649.000.

Karppanen, Pirjo L.: *See*—
Karppanen, Heikki; and Karppanen, Pirjo L., 4,931,305, Cl. 426-649.000.

Karvinen, Mikko; and Laapotti, Jorma, to Valmet Oy. Press section with separate press nips in a paper machine. 4,931,143, Cl. 162-360.100.

Kasahara, Takeshi, to Toko Kabushiki Kaisha. Semiconductor device. 4,932,064, Cl. 382-8.000.

Kasai, Tadashi: *See*—
Kikuchi, Hiroshi; Tanuma, Jiro; Ishimizu, Hideaki; and Kasai, Tadashi, 4,930,915, Cl. 400-175.000.

Kasei Optonix, Ltd.: *See*—
Kagami, Akiyasu; and Hase, Takashi, 4,931,651, Cl. 250-484.100.

Kashiwa, Norio: *See*—
Yoshitake, Junichi; Kitani, Hiroaki; Muranaka, Takeshi; Mizuno, Akira; and Kashiwa, Norio, 4,931,526, Cl. 526-336.000.

Kashiwagi, Mayumi; Sasaki, Toshiaki; Mitsumura, Satoshi; and Kato, Masayoshi, to Canon Kabushiki Kaisha. Pneumatic pulverizer and pulverizing method. 4,930,707, Cl. 241-5.000.

Kasoff Enterprises, Inc.: *See*—
Kasoff, James A.; and Stone, William C., 4,932,045, Cl. 377-24.200.

Kasoff, James A.; and Stone, William C., to Kasoff Enterprises, Inc. Waterproof digital lap counter. 4,932,045, Cl. 377-24.200.

Kastan, Peter: *See*—
Phillips, Kirk B.; and Kastan, Peter, 4,931,769, Cl. 340-541.000.

Kasukabe, Susumu; Ookubo, Masasi; Akiba, Yutaka; Tanaka, Minoru; and Yokono, Hitoshi, to Hitachi, Ltd. Apparatus for testing semiconductor device. 4,931,726, Cl. 324-158.00F.

Katagiri, Junichi: *See*—
Sugawara, Katuo; Takahashi, Akio; Katagiri, Junichi; Nagai, Akira; Ono, Masahiro; and Narahara, Toshikazu, 4,931,507, Cl. 525-193.000.

Katinger, Hermann W. Retaining biocatalyst particles in a liquid mixture. 4,931,388, Cl. 435-41.000.

Katircioglu, Haluk; De Beule, John A.; Mukherjee, Debaditya; and Whitlock, Gary C., to Unisys Corporation. Error log system for self-testing in very large scale integrated circuit (VLSI) units. 4,932,028, Cl. 371-16.500.

Kato Hatsujo Kaisha, Ltd.: *See*—
Takahashi, Yasuo; and Hojima, Toshinari, 4,930,191, Cl. 24-20.00R.

Kato, Hisaaki: *See*—
Mori, Hideshi; Kato, Hisaaki; Miyaoka, Mitsuhiko; and Yamaguchi, Hiroshi, 4,930,303, Cl. 57-328.000.

Kato, Keishi: *See*—
Shiozawa, Etsuo; Kato, Keishi; and Yoshimi, Yoshiki, 4,931,334, Cl. 428-137.000.

Kato, Masayoshi: *See*—
Kashiwagi, Mayumi; Sasaki, Toshiaki; Mitsumura, Satoshi; and Kato, Masayoshi, 4,930,707, Cl. 241-5.000.

Kato, Shoichi; and Hayaoka, Tatsumi, to Nippon Kayaku Kabushiki Kaisha. Ether derivative and an acaricidal or insecticidal composition comprising said derivative. 4,931,474, Cl. 514-708.000.

Kato, Yukihiro; Kawasaki, Eishi; and Mizukoshi, Masahito, to Nippondenso Co., Ltd. Semiconductor pressure sensor. 4,930,353, Cl. 73-727.000.

Katre, Nandini; and Knauf, Michael J., to Cetus Corporation. Succinylated interleukin-2 for pharmaceutical compositions. 4,931,544, Cl. 530-351.000.

Katsumata, Toshiyuki: *See*—
Kawakami, Tamaki; Endo, Masayasu; and Katsumata, Toshiyuki, 4,931,912, Cl. 362-61.000.

Katsunori, Takamoto: *See*—
Yoshifumi, Murata; Teruhisa, Kaneda; Kazuo, Hara; Katsunori, Takamoto; Isao, Ohonishi; and Shinichi, Yokota, 4,931,538, Cl. 528-292.000.

Katsura, Hirofumi: *See*—
Fujisawa, Mutsuo; Kameda, Tsutomu; Katsura, Hirofumi; Yamaga, Reiichi; and Ishido, Setsuko, 4,931,096, Cl. 106-35.000.

Katto, Takayuki: *See*—
Iizuka, Yo; Iwasaki, Takao; Katto, Takayuki; and Shiiki, Zenya, 4,931,516, Cl. 526-62.000.

Katz, Louis: *See*—
Henriksen, William; Katz, Louis; and Wuchinich, David G., 4,930,512, Cl. 128-661.060.

Katz, Ronald A.; and Ross, Dennis L., to First Data Resources Inc. Telephone programming system for automated calling. 4,932,046, Cl. 379-32.000.

Katznelson, Ron D., to M/A-COM Government Systems, Inc.; and Cable/Home Communication Corp. Metering retrieval of encrypted data stored in customer data retrieval terminal. 4,932,055, Cl. 380-4.000.

Kaufel Group, Ltd.: *See*—
MacIntyre, Hazen L.; Graham, Richard D., II; and Aldava, Michael B., 4,931,738, Cl. 324-435.000.

Kaufman, Robert E.: *See*—
Stier, Sam S.; and Kaufman, Robert E., 4,931,330, Cl. 428-40.000.

Kautt, Jean-Jacques, to Ferco International. Machine for assembling the different parts of a fitting element of a door or window fitting. 4,930,212, Cl. 29-788.000.

Kawa, Hajimu: *See*—
Bierschenk, Thomas R.; Juhlke, Timothy J.; Lagow, Richard J.; and Kawa, Hajimu, 4,931,199, Cl. 252-68.000.

Kawabata, Takanobu; and Harada, Noritake, to Kabushiki Kaisha Tokyo Kikai Seisakusho. Apparatus for quickly discharging ink from ink supply device. 4,930,416, Cl. 101-364.000.

Kawabata, Toshiyasu: *See*—
Tomita, Masami; Kawabata, Toshiyasu; Nanya, Toshiki; and Murayama, Hisao, 4,931,374, Cl. 430-106.000.

Kawachi, Shoji; Tomoda, Masayasu; Oka, Masahiko; Furukawa, Yasuyoshi; and Tanaka, Hiroyuki, to Daikin Industries, Ltd. Crosslinkable coating composition. 4,931,511, Cl. 525-326.300.

Kawagishi, Toshio: *See*—
Morigaki, Masakazu; Kawagishi, Toshio; Nakaryo, Kiyoshi; Seto, Nobuo; and Kamei, Sadao, 4,931,382, Cl. 430-512.000.

Kawagishi, Yoji; Narita, Shinichi; Kiriu, Takashi; and Yamanaka, Schunichiro, to Orient Chemical Industries, Ltd. Compounds usable in a toner for developing electrostatic latent images. 4,931,588, Cl. 562-68.000.

Kawahara, Yoshihiro: *See*—
Takei, Terutaka; Morita, Shigeru; Togoshi, Yoshikazu; and Kawahara, Yoshihiro, 4,930,296, Cl. 56-11.300.

Kawai, Akira: *See*—
Ishiguro, Mamoru; and Kawai, Akira, 4,931,422, Cl. 503-214.000.

Kawai, Kenji: *See*—
Yamada, Teruaki; Ukena, Toshiyasu; Akisue, Osamu; Kawai, Kenji; Sano, Yuuji; and Hayashida, Teruki, 4,931,107, Cl. 148-12.300.

Kawakami, Soichiro: *See*—
Fukaya, Masaki; Kawakami, Soichiro; Itabashi, Satoshi; Terada, Katsunori; Gofuku, Ihachiro; Nakagawa, Katsumi; Hatanaka, Katsunori; Isobe, Yoshinori; Saika, Toshihiro; Kaneko, Tetsuya; Kitahara, Nobuko; and Suzuki, Hideyuki, 4,931,661, Cl. 250-578.100.

Kawakami, Tamaki; Endo, Masayasu; and Katsumata, Toshiyuki, to Koito Manufacturing Co., Ltd. Square headlamp for automobile. 4,931,912, Cl. 362-61.000.

Kawakami, Yasushi, to Brother Kogyo Kabushiki Kaisha. Word processor for locating beginning position of text element and displaying corresponding formatting data and formatting mark separately. 4,931,987, Cl. 364-900.000.

Kawamura, Fumio: *See*—
Baba, Tsutomu; Kawamura, Fumio; Chino, Koichi; Tsuchiya, Kiroyuki; Kikuchi, Makoto; and Tamata, Shin, 4,931,222, Cl. 252-628.000.

Kawamura, Hideaki; Sakurada, Nobuaki; and Sasaki, Takashi, to Canon Kabushiki Kaisha. Image forming apparatus which performs gamma correction on the basis of a cumulative frequency distribution produced from a histogram of image data representing a selected area of an image. 4,931,864, Cl. 358-80.000.

Kawamura, Ikunosuke: *See*—
Yonemasu, Hiro; Shirai, Kiyohide; and Kawamura, Ikunosuke, 4,931,854, Cl. 357-74.000.

Kawamura, Mitsuyoshi; and Taniguchi, Masato, to NGK Spark Plug Co., Ltd. Heat-insulating metal-ceramic structure. 4,930,546, Cl. 138-149.000.

Kawamura, Shin-ichi: *See*—
Kamitake, Takashi; Kawamura, Shin-ichi; and Abe, Masahiro, 4,931,979, Cl. 364-745.000.

Kawanishi, Isamu; and Ogawara, Makoto, to Kawasaki Jukogyo Kabushiki Kaisha. Method of smoothing the outer surface of a structure with sliding doors and a sliding door with a mechanism for smoothing the outer surface. 4,930,256, Cl. 49-209.000.

Kawano, Satoshi; Kimura, Yoshio; and Fukushima, Eiji, to Sanden Corporation. Apparatus and method for clamping a work piece for machining thereof. 4,930,955, Cl. 409-225.000.

Kawarabashi, Tsukasa, to Murata Kikai Kabushiki Kaisha. Device for catching yarn upon yarn break in two-for-one twister. 4,930,301, Cl. 57-80.000.

Kawasaki, Eishi: *See*—
Kato, Yukihiro; Kawasaki, Eishi; and Mizukoshi, Masahito, 4,930,353, Cl. 73-727.000.

Kawasaki, Glenn; and Bell, Leslie, to ZymoGenetics, Inc. Stable DNA constructs for expression of α-1 antitrypsin. 4,931,373, Cl. 435-69.200.

Kawasaki Steel Corp.: *See*—
Kojima, Shinji; Matsukawa, Toshitane; Mizota, Hisakazu; Yuhara, Susumu; Yoshimoto, Yoshio; Fujimura, Toshio; and Ito, Kunihiro, 4,930,207, Cl. 29-527.500.
Tosaka, Akio; Sakata, Kei; Hashiguchi, Koichi; Higashino, Tateo; and Ichida, Toshio, 4,931,106, Cl. 148-12.00C.

Kawashima, Saburo: *See*—
Tamai, Shoji; Ohta, Masahiro; Kawashima, Saburo; Iiyama, Katsuaki; Oikawa, Hideaki; and Yamaguchi, Akihiro, 4,931,531, Cl. 528-172.000.

Kawashima, Takeshi: *See*—
Nishio, Hiroaki; and Kawashima, Takeshi, 4,931,238, Cl. 264-62.000.

Kawasaki Jukogyo Kabushiki Kaisha: *See*—
Kawanishi, Isamu; and Ogawara, Makoto, 4,930,256, Cl. 49-209.000.
Kawata, Shoji; Miyake, Osamu; Suzumura, Nobuyasu; and Takeuchi, Motohide, to Aisin Seiki Kabushiki Kaisha. Constant-speed running controller. 4,931,939, Cl. 364-426.040.
Kayen, Samuel L.: *See*—
Smilow, George; and Kayen, Samuel L., 4,930,692, Cl. 223-85.000.
Kayos, Csaba: *See*—
Pelyva, Jeno ; Soptei, Csaba; Kolonics, Zoltan; Karacsonyi, Bela; Balint, Sandor; Benczik, Janosne ; Kayos, Csaba; Lendvai, Laszlo ; and Laszlo, Sandor, 4,931,585, Cl. 562-17.000.
Kazuo, Hara: *See*—
Yoshifumi, Mursta; Teruhisa, Kaneda; Kazuo, Hara; Katsunori, Takamoto; Isao, Ohonishi; and Shinichi, Yokota, 4,931,538, Cl. 528-292.000.
KCAP Manufacturing, Inc.: *See*—
Mills, Paul A., 4,930,785, Cl. 273-183.00D.
Keeley, Edward M., to Coastvision. Method of manufacturing soft contact lens buttons. 4,931,228, Cl. 264-2.600.
Keeney, Clare G.; Passon, Gary L.; Hagen, Ronald J.; Foster, Chris D.; and Fritach, Frank J., to Telenova, Inc. Integrated voice and data telephone system. 4,932,022, Cl. 370-60.000.
Keiper Recaro GmbH & Co.: *See*—
Wittig, Werner, 4,930,841, Cl. 297-379.000.
Kelleher, William J.; and McClintock, William J., to Richardson-Vicks Inc. Anesthetic oral compositions. 4,931,473, Cl. 514-688.000.
Keller, Glenn J.; and Solis, Javier A., to Epyx, Inc. Apparatus and method for producing pulse width modulated signals from digital information. 4,931,751, Cl. 332-108.000.
Keller, Hans J.: *See*—
Kuster, Walter; and Keller, Hans J., 4,930,864, Cl. 350-167.000.
Kellogg, Jack A.: *See*—
Kellogg, Steven L.; and Kellogg, Jack A., 4,930,390, Cl. 84-611.000.
Kellogg, Steven L.; and Kellogg, Jack A., to Yamaha Corporation. Automatic musical performance apparatus having separate level data storage. 4,930,390, Cl. 84-611.000.
Kelly, David L.; and Bennetts, Steven A., to Burke Company, The. Apparatus and method for lifting tilt-up wall constructions. 4,930,269, Cl. 52-125.500.
Kelsey-Hayes Company: *See*—
Evans, Anthony C., 4,930,340, Cl. 73-1.00J.
Sporzynski, Robert S.; Evans, Anthony C.; and Robinette, Richard T., 4,930,606, Cl. 188-218.0XL.
Kemner, Rudolf; and Kalmijn, Hilco T., to U.S. Philips Corporation. Magnetic resonance apparatus having a quadrature RF coil system. 4,931,734, Cl. 324-318.000.
Kenmochi, Toshio; and Hashimoto, Takaaki, to Canon Kabushiki Kaisha. Data communication apparatus with voice communication control. 4,932,048, Cl. 379-67.000.
Kenneally, Corey J.: *See*—
Gibson, Michael S.; Hawkins, Larry N.; Peffly, Marjorie M.; Kenneally, Corey J.; and Corrigan, Patrick J., 4,931,552, Cl. 536-119.000.
Kennedy, Andrew M., II: *See*—
Nelson, William W.; Lesko, Camille A.; Kennedy, Andrew M., II; and Dunn, Vernon E., 4,931,753, Cl. 333-161.000.
Kennedy, Richard A.: *See*—
Marrah, Jeffrey J.; Manlove, Gregory J.; and Kennedy, Richard A., 4,932,058, Cl. 381-13.000.
Kenner, Erich: *See*—
Reiser, Peter; and Kenner, Erich, 4,931,011, Cl. 431-3.000.
Kenny, Andrew A.: *See*—
DeVara, Dennis; and Kenny, Andrew A., 4,931,710, Cl. 318-663.000.
Keptel, Inc.: *See*—
Karan, Joel; and Collins, Thomas J., 4,932,051, Cl. 379-399.000.
Kerscher, Volker: *See*—
Knebel, Joachim; Kerscher, Volker; and Ude, Werner, 4,931,594, Cl. 568-727.000.
Kersten, Siegfried; Jaeger, Karl-Friedrich; Koenig, Karl-Heinz; Mueller, Albrecht; Pawliczek, Josef B.; Recker, Hans-Gert; Rohr, Wolfgang; and Wigger, August, to BASF Aktiengesellschaft. Crystalline form and its preparation. 4,931,466, Cl. 514-490.000.
Kesel, Bruno; Zink, Gerhard; and Winter, Karin, to Robert Bosch GmbH. Impeller. 4,930,984, Cl. 416-203.000.
Kester, John J.: *See*—
Volkmann, Curtis L.; Kester, John J.; and Stevens, Gregory A., 4,931,125, Cl. 156-272.800.
Ketchpel, Paul A., to Stanley Works, The. Coilable tape rule with improved end hook. 4,930,227, Cl. 33-755.000.
Keyes, Denis E.; and Aronoff, Marvin S., to E. R. Squibb & Sons, Inc. Method of disposal of articles by flushing. 4,930,942, Cl. 406-49.000.
Khan, Aurangzeb K., to Tandem Computers Incorporated. True TTL to true ECL bi-directional tristatable translator driver circuit. 4,931,672, Cl. 307-475.000.
Khanna, Dinesh N.: *See*—
Mueller, Werner H.; Khanna, Dinesh N.; Vora, Rohitkumar H.; and Erckel, Ruediger J., 4,931,540, Cl. 528-353.000.
Khanna, Jai K.; Silvey, Norman G.; and Williams, Charles D., to Household Manufacturing, Inc. Compressor stage with multiple vented inducer shroud. 4,930,978, Cl. 415-58.300.
Khanzadian, Sarkis. Keyboard protector. 4,930,388, Cl. 84-183.000.
Khrapov, Valery G.: *See*—
Chernyak, Zinovy A.; Tsvetkov, Alexandr A.; Onischenko, Alexandr M.; Kandala, Anatoly I.; Khrapov, Valery G.; Nunuparov, Georgy M.; Slavinsky, Vladimir M.; Geikhman, Isaak L.; Omelchenko, Nikolai P.; Rafalovich, Boris A.; Silaev, Viktor I.; and Zhdanov, Konstantin F., 4,931,638, Cl. 250-253.000.
Kicherer, Robert; and Schreder, Felix, to E.G.O. Elektro-Geraete Blanc u. Fischer. Electric hotplate. 4,931,620, Cl. 219-463.000.
Kijima Co., Ltd.: *See*—
Kijima, Seiichi, 4,931,761, Cl. 336-160.000.
Kijima, Seiichi, to Kijima Co., Ltd. Compact transformer. 4,931,761, Cl. 336-160.000.
Kikuchi, Akira: *See*—
Okabe, Minoru; and Kikuchi, Akira, 4,930,861, Cl. 350-96.250.
Kikuchi, Hiroshi; Tanuma, Jiro; Ishimizu, Hideaki; and Kasai, Tadashi, to Oki Electric Industry Co., Ltd. Printer having means for identifying print head type. 4,930,915, Cl. 400-175.000.
Kikuchi, Kenichi, to Olympus Optical Co., Ltd. Electronic endoscope apparatus having an isolation circuit for isolating a patient circuit from a secondary circuit. 4,931,867, Cl. 358-98.000.
Kikuchi, Makoto: *See*—
Baba, Tsutomu; Kawamura, Fumio; Chino, Koichi; Tsuchiya, Kiroyuki; Kikuchi, Makoto; and Tamata, Shin, 4,931,222, Cl. 252-628.000.
Kikuchi, Toshihiro: *See*—
Matsumoto, Masakazu; Ishikawa, Shozo; Ando, Wataru; Kikuchi, Toshihiro; and Yamazaki, Itaru, 4,931,371, Cl. 430-59.000.
Kikuda, Shigeru; Yamada, Michihiro; and Miyamoto, Hiroshi, to Mitsubishi Denki Kabushiki Kaisha. MIS transistor driven inverter circuit capable of individually controlling rising portion and falling portion of output waveform. 4,931,668, Cl. 307-443.000.
Kilpinen, Michael: *See*—
Cichoski, Richard; and Kilpinen, Michael, 4,930,833, Cl. 296-136.000.
Kim, Kwon H.; Henderson, Norman L.; and Chien, Yie W., to Hoechst-Roussel Pharmaceuticals Inc. Laminar structure for administering a chemical at a controlled release rate. 4,931,281, Cl. 424-448.000.
Kim, Sung W.: *See*—
Bae, You H.; Okano, Teruo; and Kim, Sung W., 4,931,287, Cl. 424-484.000.
Kimberly-Clark Corporation: *See*—
Shanklin, Gary L.; and Win, Maung H., 4,931,200, Cl. 252-91.000.
Kimbrough, Robert L.; and Chapman, Donald L., to Square D Company. Junction boxes. 4,931,597, Cl. 174-48.000.
Kimura, Akiteru: *See*—
Takase, Hiroshi; Goto, Hisashi; Inoue, Takashi; Sakurai, Hidenori; and Kimura, Akiteru, 4,930,881, Cl. 350-445.000.
Kimura, Haruo; Nobuo, Minematsu; and Shin-ichi, Suto, to Oki Electric Industry Co., Ltd. Self-diagnosis method for a bank note depositing and dispensing machine. 4,931,963, Cl. 364-551.010.
Kimura, Norio, to Morinaga & Co., Ltd. *Bacillus subtilis* strain and prevention of aflatoxin contamination in cereals and nuts. 4,931,398, Cl. 435-252.500.
Kimura, Takafumi; Yamawaki, Hideki; Ikeda, Kazuto; and Ihara, Masaru, to Fujitsu Limited. Process for chemical vapor deposition of superconductive oxide. 4,931,425, Cl. 505-1.000.
Kimura, Yoshio: *See*—
Kawano, Satoshi; Kimura, Yoshio; and Fukushima, Eiji, 4,930,955, Cl. 409-225.000.
Kimura, Yukio: *See*—
Suzuki, Takashi; and Kimura, Yukio, 4,930,206, Cl. 29-525.200.
King, James D.; and Werts, Stephen D., to Henny Penny Corporation. Large capacity pressure cooker. 4,930,408, Cl. 99-407.000.
King, Lawrence A.: *See*—
Goff, Larry; King, Lawrence A.; Barnett, Daniel B.; and Justice, Samuel P., 4,931,745, Cl. 330-9.000.
King, Mathew B. Apparatus for supporting an eyeglass frame lens assembly in a diving or protective mask. 4,930,163, Cl. 2-444.000.
King, Roswell E., III: *See*—
Foster, George N.; Petty, Herbert E.; Blevins, Charles H., II; and King, Roswell E., III, 4,931,492, Cl. 524-188.000.
Kinugasa, Hirofumi: *See*—
Yoshida, Yasuo; Kakinuma, Tadashi; Sakurai, Tadashi; Kishima, Yoshio; and Kinugasa, Hirofumi, 4,931,655, Cl. 250-492.100.
Kioritz Corporation: *See*—
Kamata, Yoshikiyo, 4,930,462, Cl. 123-73.0AD.
Masuda, Isao; and Iida, Giichi, 4,930,467, Cl. 123-179.00P.
Kiriu, Takashi: *See*—
Kawagishi, Yoji; Narita, Shinichi; Kiriu, Takashi; and Yamanaka, Schunichiro, 4,931,588, Cl. 562-68.000.
Kirshner, Mark F.: *See*—
Symons, Robert S.; and Kirshner, Mark F., 4,931,694, Cl. 315-3.500.
Kishi, Takeshi: *See*—
Ishimaru, Takeshi; Kishi, Takeshi; and Yoshino, Shigeo, 4,930,743, Cl. 248-638.000.
Kishima, Yoshio: *See*—
Yoshida, Yasuo; Kakinuma, Tadashi; Sakurai, Tadashi; Kishima, Yoshio; and Kinugasa, Hirofumi, 4,931,655, Cl. 250-492.100.
Kitagawa, Kiyohiro: *See*—
Kojima, Eiji; Kitagawa, Kiyohiro; and Seto, Akira, 4,931,291, Cl. 426-2.000.
Kitahama, Koji; Mishima, Kyoichi; and Kumasaki, Toshimi, to Mitsuboshi Belting Ltd. Method of manufacturing multiribbed belts. 4,931,118, Cl. 156-138.000.
Kitahara, Nobuko: *See*—
Fukaya, Masaki; Kawakami, Soichiro; Itabashi, Satoshi; Terada, Katsunori; Gofuku, Ihachiro; Nakagawa, Katsumi; Hatanaka, Katsunori; Isobe, Yoshinori; Saika, Toshihiro; Kaneko, Tetsuya;

Kitahara, Nobuko; and Suzuki, Hideyuki, 4,931,661, Cl. 250-578.100.
Kitamura, Takashi: *See*—
Iimuro, Shigeru; Morimoto, Yoshio; and Kitamura, Takashi, 4,931,146, Cl. 203-92.000.
Kitani, Hiroaki: *See*—
Yoshitake, Junichi; Kitani, Hiroaki; Muranaka, Takeshi; Mizuno, Akira; and Kashiwa, Norio, 4,931,526, Cl. 526-336.000.
Kitano, Toshiaki: *See*—
Yamamoto, Kaoru; Kitano, Toshiaki; and Sano, Hiroyuki, 4,931,535, Cl. 528-230.000.
Kitazawa, Kozo: *See*—
Anzawa, Norio; Yazaki, Hisashi; Adachi, Kozi; Watanabe, Naoki; Miyabe, Shuichi; and Kitazawa, Kozo, 4,931,108, Cl. 148-18.000.
Kitchens, Wesley P. Portable envelope feeder. 4,930,762, Cl. 271-11.000.
Kittle, Carl E.: *See*—
Boe, Thomas E.; Bergene, Mark A.; Kittle, Carl E.; and Sparks, Gregory E., 4,931,967, Cl. 364-571.010.
Kiyohara, Nobuo: *See*—
Wakui, Hitoshi; Kiyohara, Nobuo; Nishino, Haruo; and Yamamoto, Osamu, 4,931,263, Cl. 423-215.500.
Klaenhammer, Todd R.; Sanozky, Rosemary B.; and Steenson, Larry R., to North Carolina State University. pTR2030, a conjugal plasmid and derivatives thereof that confer phage reisistance to group N streptococci. 4,931,396, Cl. 435-252.300.
Klassen, Horst: *See*—
Dany, Franz-Josef; Klassen, Horst; Adrian, Renate; Prell, Hedwig; and Kalteyer, Gerhard, 4,931,272, Cl. 424-49.000.
Klaus, Michael; Loeliger, Peter; and Weiser, Harald, to Hoffmann-La Roche Inc. Heterocyclic rodenticidal compounds, compositions containing the compounds, and methods of use. 4,931,458, Cl. 514-354.000.
Klein, Hans-Ulrich; and Kratzenstein, Klaus. Process and apparatus for the biological purification of water. 4,931,183, Cl. 210-614.000.
Klein, Joseph T.: *See*—
Effland, Richard C.; Klein, Joseph T.; Olsen, Gordon E.; and Davis, Larry, 4,931,457, Cl. 514-349.000.
Klein, Keith W.: *See*—
Castonguay, Roger N.; Klein, Keith W.; Arnold, David; and Ellis, Preston L., 4,931,603, Cl. 200-144.00R.
Klein, Phillip P., to Temperature Research Corporation. Apparatus for localized heat and cold therapy. 4,930,317, Cl. 62-3.300.
Kleiner, Hans-Jerg: *See*—
Gerdau, Thomas; Kleiner, Hans-Jerg; Peuckert, Marcellus; Bruck, Martin; and Aldinger, Fritz, 4,931,513, Cl. 525-474.000.
Kleinschmit, Peter: *See*—
Siray, Mustafa; and Kleinschmit, Peter, 4,931,593, Cl. 364-296.000.
Kleinstuck, Roland; Lensch, Cornelia; Immenkeppel, Michael; Block, Hans-Dieter; and Odenbach, Herbert, to Bayer Aktiengesellschaft. Process for the continuous production of 2-phosphose-butane-1,2,4-tricarboxylic acid and alkali metal salts thereof. 4,931,586, Cl. 562-24.000.
Klemes, Marek, to Canadian Marconi Company. Vectorial adaptive filtering apparatus with convergence rate independent of signal parameters. 4,931,977, Cl. 364-581.000.
Klenzoid, Inc.: *See*—
Derham, James J.; Hannigan, Joseph M.; and Derham, Joseph, 4,931,187, Cl. 210-662.000.
Klimas, David R., to Camino Laboratorties, Inc. Catheter coupling system. 4,931,049, Cl. 604-165.000.
Klingmann, Rolf: *See*—
Gluck, Roland; Heilemann, Otto; and Klingmann, Rolf, 4,930,792, Cl. 277-235.00B.
Klos, Leo V.; and Hertel, Richard J., to Varian Associates, Inc. Fluid flow sensor with flexible vane. 4,931,776, Cl. 340-610.000.
Klueh, David R.; Morris, Jack W.; Urdahl, Kent G.; and Zimmer, Matthew K., to International Business Machines Corporation. Reduced thickness resin substrate in film printing ribbon. 4,931,348, Cl. 428-207.000.
Kluger, Wolfgang: *See*—
Ahrens, Norbert; Kluger, Wolfgang; Mihatsch, Joachim-Rudolf; and Rzadki, Hans-Jurgen, 4,930,943, Cl. 406-90.000.
Klun, Jerome A.: *See*—
Schwarz, Meyer; Klun, Jerome A.; and Snow, J.Wendell, 4,931,032, Cl. 514-546.000.
Klute, Ferdinand. Wind power plant. 4,930,985, Cl. 416-8.000.
KMK Karl Maegerle Lizenz AG: *See*—
Schwyn, Bernhard; and Ueberegger, Heinrich, 4,931,006, Cl. 425-412.000.
Knauer, Karl, to Siemens Aktiengesellschaft. Multi-place ripple-carry adder. 4,931,981, Cl. 364-784.000.
Knauf, Michael J.: *See*—
Katre, Nandini; and Knauf, Michael J., 4,931,544, Cl. 530-351.000.
Knebel, Joachim; Kerscher, Volker; and Ude, Werner, to Rohm GmbH. Method for making aromatic bisphenols. 4,931,594, Cl. 568-727.000.
Knecht, Hugo; and Luscher, Rene , to Ciba-Geigy Corporation. Photographic copying and enlarging apparatus. 4,931,831, Cl. 355-75.000.
Knoble, David W., to General Electric Company. Ballast system including a starting aid for a gaseous discharge lamp. 4,931,699, Cl. 315-276.000.
Knoll, William C., to GTE Products Corporation. Controller for coded surface acoustical wave (SAW) security system. 4,931,664, Cl. 307-10.300.
Knopp, Leslie C.; and Baumgartle, Kenneth M., to Hartley Controls Corporation. Automatic bond determinator. 4,930,354, Cl. 73-823.000.
Knowles, Carl H., to Metrologic Instruments, Inc. Portable laser scanner with integral scanner engine. 4,930,848, Cl. 350-6.600.
Knox, Ingrid L.: *See*—
Malhotra, Sudarshan K.; Dripps, James E.; Bradfisch, Gregory A.; Wollowitz, Susan; and Knox, Ingrid L., 4,931,452, Cl. 514-344.000.
Kobayashi, Hiroshi; and Suda, Shinji, to Mitsubishi Denki Kabushiki Kaisha. Digital remote control method. 4,931,790, Cl. 340-825.640.
Kobayashi, Katsuyuki: *See*—
Kaneko, Kiyoshi; Tanaka, Atsushi; Yoshimura, Yuichiro; Kobayashi, Katsuyuki; and Tanishi, Shinnosuke, 4,931,965, Cl. 364-560.000.
Kobayashi, Kenji: *See*—
Naito, Masataka; Honjo, Takeshi; Kobayashi, Kenji; Saito, Jun; Shido, Hironori; and Hiroi, Masakazu, 4,930,761, Cl. 270-53.000.
Kobayashi, Kenzo: *See*—
Murai, Ryuichi; and Kobayashi, Kenzo, 4,931,951, Cl. 364-513.000.
Kobayashi, Kouichi, to Maruichi Selling Kabushiki Kaisha. Foldable and transformable thick mat. 4,930,170, Cl. 5-12.00R.
Kobayashi, Shoichi; Mikuni, Katsuhiko; Monma, Mitsuru; Takano, Toshiya; Hara, Kozo; and Hashimoto, Hitoshi, to Director of National Food Research Institute, Minstry of Agriculture, Forestry and Fisheries; and Ensuiko Sugar Regining Co., Ltd. Method for the preparation of multiple glucosyl branched-cyclodextrins. 4,931,389, Cl. 435-95.000.
Kobayashi, Tadashi, to Canon Kabushiki Kaisha. Method for regenerating information from a magneto-optical information recording medium. 4,932,012, Cl. 369-13.000.
Kobler, Ingo, to MAN Roland Druckmaschinen AG. Combination cutting and path switching apparatus for moving webs, particularly printed paper substrates, and method. 4,930,383, Cl. 83-27.000.
Kobos, Robert K.; and Peloni, Lorenzo F., to Du Pont de Nemours, E. I., and Company. Fluoride ion-selective electrodes based upon superionic conducting ternary compounds and methods of making. 4,931,172, Cl. 204-418.000.
Kobylenski, Dennis E.; and Boehner, Loren W., to Magnetic Perpherals Inc. Magnetic disk substrate polishing assembly. 4,930,259, Cl. 51-89.000.
Koch, Detlef: *See*—
Brenke, Matthias; and Koch, Detlef, 4,931,093, Cl. 106-19.000.
Koch, Herbert; and Weimar, Peter, to Ernst Leitz Wetzlar GmbH. Adjustable microscope focusing drive. 4,930,882, Cl. 350-530.000.
Koch, Thomas L.; and Koren, Uziel, to AT&T Bell Laboratories. Tapered semiconductor waveguides. 4,932,032, Cl. 372-45.000.
Koch, Werner; and Ruppert, Gunther, to Bruckner-Apparatebau GmbH. Method and apparatus for discontinuous wet processing of knitted or worked textile material. 4,931,064, Cl. 8-149.100.
Kodama, Yukinori; and Furuyama, Takaaki, to Fujitsu Limited. Semiconductor memory device having pseudo row decoder. 4,932,000, Cl. 365-230.060.
Koei Chemical Co., Ltd.: *See*—
Shimizu, Shinkichi; Shoji, Takayuki; Kono, Kanji; and Nakaishi, Toru, 4,931,561, Cl. 544-336.000.
Koenig, Karl-Heinz: *See*—
Kersten, Siegfried; Jaeger, Karl-Friedrich; Koenig, Karl-Heinz; Mueller, Albrecht; Pawliczek, Josef B.; Recker, Hans-Gert; Rohr, Wolfgang; and Wigger, August, 4,931,466, Cl. 514-490.000.
Koga, Toshio; Ohki, Junichi; Ohta, Mutsumi; and Kunihiro, Hideto, to NEC Corp.; and NEC Home Electronics Ltd. Image processing system for recording or reproducing an image signal sequence which has been encoded by employing two predictive coding methods and combining the results of those methods. 4,931,879, Cl. 358-335.000.
Kogawara, Toshiro: *See*—
Amaya, Shinji; Iwanari, Yoshiyuki; Shinzo, Kinji; Kogawara, Toshiro; Yamazaki, Syuuichi; Shimizu, Seiichi; and Kuriyama, Kazuya, 4,931,370, Cl. 430-45.000.
Kogo, Masanori, to Tokin Corporation. Electromagnetic anechoic chamber with an inner electromagnetic wave reflection surface and an electromagnetic wave absorption small ball disposed in the chamber. 4,931,798, Cl. 342-4.000.
Koh-I-Noor Rapidograph, Inc.: *See*—
Anderka, Gerold, 4,930,921, Cl. 401-258.000.
Kohler Co.: *See*—
Gold/daig, Joseph E.; and McKinney, Larry G., 4,931,007, Cl. 425-438.000.
Kohlstedde, Werner: *See*—
Grenz, Gunter; and Kohlstedde, Werner, 4,930,715, Cl. 242-83.000.
Kohno, Hisao: *See*—
Hasegawa, Masaru; Suda, Osamu; Kohno, Hisao; Sekino, Toshifumi; Umezaki, Tetsuhiro; and Tanaka, Norio, 4,931,349, Cl. 430-58.000.
Koide, Yoshiaki: *See*—
Inou, Kiyoharu; Koide, Yoshiaki; and Iwata, Yasunobu, 4,931,918, Cl. 363-19.000.
Koinuma, Yasumi: *See*—
Iryo, Takeaki; Kubota, Satoshi; Sano, Yoshio; Murata, Yoshishige; and Koinuma, Yasumi, 4,930,879, Cl. 350-409.000.
Koito Manufacturing Co., Ltd.: *See*—
Kawakami, Tamaki; Endo, Masayasu; and Katsumata, Toshiyuki, 4,931,912, Cl. 362-61.000.
Koito Seisakusho Co., Ltd.: *See*—
Nagasawa, Hidehiko, 4,930,367, Cl. 74-416.000.

Koizumi, Soei: *See*—
Shima, Shizuo; and Koizumi, Soei, 4,931,317, Cl. 427-385.500.

Kojima, Eiji; Kitagawa, Kiyohiro; and Seto, Akira, to Nisshin Oil Mills, Ltd., The. Feeds for larvae of crustaceons and shellfish. 4,931,291, Cl. 426-2.000.

Kojima, Kunio; Sakamoto, Noriaki; Deguchi, Toshihisa; and Yamane, Daiji, to Sharp Kabushiki Kaisha. Apparatus for reading an optical disk which controls track jumping accurately and stably. 4,932,013, Cl. 369-32.000.

Kojima, Shinji; Matsukawa, Toshitane; Mizota, Hisakazu; Yuhara, Susumu; Yoshimoto, Yoshio; Fujimura, Toshio; and Ito, Kunihiro, to Kawasaki Steel Corp. Method and apparatus for continuous compression forging of continuously cast steel. 4,930,207, Cl. 29-527.500.

Kokubu, Takemitsu; and Yoshioka, Hiroshi, to Hitachi, Ltd. Color picture tube with an electron shield. 4,931,690, Cl. 313-407.000.

Kokunishi, Motohide: *See*—
Uehara, Tetsuzou; Kokunishi, Motohide; Shimoi, Kenji; and Kagimasa, Hideko, 4,931,953, Cl. 364-518.000.

Kokusai Denshin Denwa Kabushiki Kaisha: *See*—
Usami, Masashi; Akiba, Shigeyuki; and Matsushima, Yuichi, 4,932,034, Cl. 372-96.000.

Kolbert, Melvin, to Grumman Aerospace Corporation. Parallel transmission to mask data radiation. 4,932,057, Cl. 380-33.000.

Kollmeier, Hans-Joachim: *See*—
Zaifkovits, Wilhelm; Gruning, Burghard; Kollmeier, Hans-Joachim; Schaefer, Dietmar; and Weitemeyer, Christian, 4,931,362, Cl. 428-402.220.

Kollmorgen Corporation: *See*—
Brown, Gerald W., 4,930,201, Cl. 29-598.000.

Kolonics, Zoltan: *See*—
Pelyva, Jeno ; Soptei, Csaba; Kolonics, Zoltan; Karacsonyi, Bela; Balint, Sandor; Benczik, Janosne ; Kayos, Csaba; Lendvai, Laszlo ; and Laszlo, Sandor, 4,931,585, Cl. 562-17.000.

Komatsu, Akio: *See*—
Ohira, Eiji; and Komatsu, Akio, 4,931,935, Cl. 364-419.000.

Komatsu, Kazunori; and Uetake, Toshikazu, to Fuji Photo Film Co., Ltd. Method and apparatus for producing magnetic recording medium. 4,931,309, Cl. 427-48.000.

Komine, Naoki: *See*—
Shimamura, Morihiko; Kamono, Shinobu; Okuyama, Junichi; Okano, Kunio; and Komine, Naoki, 4,930,607, Cl. 192-1.330.

Komori, Masahiro: *See*—
Sato, Kazuo; and Komori, Masahiro, 4,931,524, Cl. 527-301.000.

Kondo, Ryoichi: *See*—
Yanagimoto, Shigeru; and Kondo, Ryoichi, 4,930,566, Cl. 164-475.000.

Konica Corporation: *See*—
Hakamada, Haruo, 4,931,829, Cl. 355-68.000.
Sugita, Shuichi; Nakagawa, Satoshi; and Shimada, Naoko, 4,931,383, Cl. 430-551.000.
Takahashi, Hiroshi, 4,931,824, Cl. 354-484.000.
Takei, Yoshiaki; and Sakai, Eiichi, 4,931,372, Cl. 430-66.000.

Konig, Joachim: *See*—
Seckmann, Gunter; Konig, Joachim; and Baumgen, Heinz, 4,931,510, Cl. 525-302.000.

Konig, Reiner: *See*—
Wolfrum, Erhard; Faber, Wolfgang; Konig, Reiner; and Sieglen, Rolf A., 4,930,359, Cl. 73-863.230.

Konishiroku Photo Industry Co., Ltd.: *See*—
Akimoto, Kunio; Ikeuchi, Satoru; and Takizawa, Yoshio, 4,931,375, Cl. 430-109.000.

Kono, Kanji: *See*—
Shimizu, Shinkichi; Shoji, Takayuki; Kono, Kanji; and Nakaishi, Toru, 4,931,561, Cl. 544-336.000.

Konrad, Eugen: *See*—
Lang, Gunther; Konrad, Eugen; Wendel, Harald; Maresch, Gerhard; and Lenz, Hans-Rudi, 4,931,271, Cl. 424-47.000.

Konrad, Gerd: *See*—
Kucera, Clare H.; Crema, Stefano C.; Roznowski, Michael D.; Konrad, Gerd; and Hartmann, Heinrich, 4,931,489, Cl. 523-130.000.

Koolajkutato Vallat: *See*—
Barlai, Zoltan; Dorcsi, Geza; Rez, Ferenc; and Vamos, Attila, 4,931,736, Cl. 324-367.000.

Koopmans, Rayment G.: *See*—
Buehler, Edgar J.; Draeger, James H.; and Koopmans, Rayment G., 4,930,334, Cl. 72-448.000.

Kopher Precision Instruments, Inc.: *See*—
Kopper, Hermann, 4,930,485, Cl. 124-91.000.

Kopp, Clinton V.: *See*—
Ford, Douglas L.; Anderson, Eric W.; and Kopp, Clinton V., 4,931,186, Cl. 210-636.000.

Koppens Automatic Fabrieken B.V.: *See*—
de la Haye, Cornelis F., 4,930,717, Cl. 242-86.000.

Kopper, Hermann, to Kopher Precision Instruments, Inc. Archery bow system having a center sock and string drawing apparatus. 4,930,485, Cl. 124-91.000.

Koppitsch, Heinrich; and Sparling, Francis, to Raychem Corporation. Branched sensor system. 4,931,741, Cl. 324-525.000.

Koren, Uziel: *See*—
Koch, Thomas L.; and Koren, Uziel, 4,932,032, Cl. 372-45.000.

Kornecki, Elizabeth H.; and Ehrlich, Yigal H., to University of Vermont, The. Pyridoxal-5'-phosphate as an in vitro anticoagulant for whole blood. 4,931,002, Cl. 424-529.000.

Korner, Wolf-Dietrich; and Harr, Thomas, to Daimler-Benz AG. Engine-braking device for internal-combustion engine. 4,930,471, Cl. 123-196.00R.

Kosaka, Yositeru; and Yamada, Kunio, to Victor Company of Japan, Ltd. Voltage controlled comb filter. 4,931,857, Cl. 358-31.000.

Koseki, Osamu: *See*—
Sugita, Toshio; Funamoto, Hiroyuki; Furuta, Kazuyoshi; and Koseki, Osamu, 4,931,307, Cl. 427-38.000.

Kosfeld, Milton M., to Bristol Compressors, Inc. Refrigerant gas compresor construction. 4,930,406, Cl. 92-144.000.

Koshizawa, Toshifumi; Yamaguchi, Satoshi; Yoshimura, Hiroshi; and Iida, Yoiichi, to Isuzu Motors Limited. Device for controlling motor vehicle to run at constant speed. 4,930,594, Cl. 180-179.000.

Koskenmaki, David C.: *See*—
Calhoun, Clyde D.; and Koskenmaki, David C., 4,931,598, Cl. 174-117.00F.

Koskie, Earl T., Jr.: *See*—
Young, David E.; Koskie, Earl T., Jr.; and Easton, Andrew R., 4,930,587, Cl. 175-251.000.

Kotler, Daniel. Modular sports tile with lateral absorption. 4,930,286, Cl. 52-177.000.

Kotraba, Norman L.: *See*—
Bottinelli, N. Edward; and Kotraba, Norman L., 4,931,090, Cl. 75-10.160.

Kotynski, Robert J.: *See*—
Smedberg, Kenneth L.; Bozich, George J.; and Kotynski, Robert J., 4,930,336, Cl. 72-453.130.

Koubek, Kevin J.: *See*—
Cirrito, Vincent; Koubek, Kevin J.; and Quadrini, John A., 4,931,905, Cl. 361-385.000.

Kozuki, Susumu: *See*—
Nakayama, Tadayoshi; Sato, Chikara; Nagasawa, Kenichi; Sasatani, Tomohiko; Yoshimura, Katsuji; Takahashi, Koji; and Kozuki, Susumu, 4,932,066, Cl. 382-56.000.

Kraft General Foods, Inc.: *See*—
Leshik, Richard R.; Dean, Jill P.; and Krimm, Dagmar, 4,931,302, Cl. 426-548.000.

Kraft, Wayne R.: *See*—
Rhodes, Joseph C., Jr.; Moore, Victor S.; Kraft, Wayne R.; and Barra, John W., 4,931,989, Cl. 364-900.000.

Kraiczek, Karsten: *See*—
Hadbawnik, Detlev; and Kraiczek, Karsten, 4,930,892, Cl. 356-328.000.

Krall, Thomas J., to Owens-Illinois Plastic Products Inc. Dispensing package for dispensing liquids. 4,930,668, Cl. 222-212.000.

Kramer, Robert A. Method of and system for identification and verification of broadcasted program segments. 4,931,871, Cl. 358-142.000.

Kransco: *See*—
Harrod, Lawrence R., 4,930,796, Cl. 280-87.021.

Krantz America, Inc.: *See*—
Morizzo, Nicholas L., 4,930,711, Cl. 242-56.00R.

Krape, Richard P.: *See*—
Cameron, Russell J.; Krape, Richard P.; and Winsand, Robert N., 4,930,401, Cl. 91-32.000.

Krasnicki, Edward J.; and Margolis, Donald L., to Welch Allyn, Inc. Double chamber acoustical tonometer. 4,930,507, Cl. 128-649.000.

Kratzenstein, Klaus: *See*—
Klein, Hans-Ulrich; and Kratzenstein, Klaus, 4,931,183, Cl. 210-614.000.

Krause, Vernon E.; and Davis, Timothy J. Christmas tree waterer. 4,930,252, Cl. 47-40.500.

Kravitz, Bernard L.: *See*—
Ehalt, Kenneth; Sheng, William; and Kravitz, Bernard L., 4,931,656, Cl. 250-551.000.

Krepski, Larry R.: *See*—
Heilmann, Steven M.; Krepski, Larry R.; Moren, Dean M.; Rasmussen, Jerald K.; and Smith, Howell K., II, 4,931,582, Cl. 560-172.000.

Kricheldorf, Hans-Rytger: *See*—
Pakull, Ralf; Eckhardt, Volker; Genz, Joachim; Idel, Karsten; Kricheldorf, Hans-Rytger; and Doring, Volker, 4,931,534, Cl. 528-193.000.

Krimm, Dagmar: *See*—
Leshik, Richard R.; Dean, Jill P.; and Krimm, Dagmar, 4,931,302, Cl. 426-548.000.

Krimmel, Heinz; Muller-Sybrichs, Manfred; Schilling, Rolf; and Weiler, Ulrich, to Werner & Pfleiderer GmbH. Method and apparatus for protecting a screw extruder producing strand-shaped explosives and propellants. 4,931,229, Cl. 264-3.300.

Krippl, Kurt; Schulte, Klaus; Hoffmann, Erwin; and Wiedermann, Rolf, to Bayer Aktiengesellschaft. Process for the preparation of polyurethane foams. 4,931,480, Cl. 521-99.000.

Krishnan, Komandur R., to Bell Communications Research, Inc. Adaptive routing of network traffic. 4,931,941, Cl. 364-437.000.

Krisko, Jeffrey M.: *See*—
Doehler, Joachim; Dotter, Buddie, II; Krisko, Jeffrey M.; and Peedin, Lester R., 4,931,756, Cl. 333-252.000.

Kristinsson, Haukur, to Ciba-Geigy Corporation. Pesticides. 4,931,439, Cl. 514-242.000.

Kristmanson, Donald J. Hinge assembly for connecting a float to a base. 4,930,184, Cl. 16-273.000.

Krofta, Milos, to Lenox Institute for Research, Inc. Water clarifying apparatus. 4,931,175, Cl. 210-86.000.

Kromer, Robert P.: *See*—
Richter, Roy; Gay, Jackson G.; and Kromer, Robert P., 4,931,944, Cl. 364-468.000.

Kronseder, Hermann. Receptacle handling machine. 4,930,614, Cl. 198-346.200.

Kroon, Peter; Deprettere, Edmond F. A.; and Shuyter, Robert J., to U.S. Philips Corporation. Multi-pulse excitation linear-predictive speech coder. 4,932,061, Cl. 381-30.000.

Kroy Inc.: *See*—
Basile, Peter A., 4,930,913, Cl. 400-120.000.

Krueger, Dennis L.; Insley, Thomas I.; Meyer, Daniel E.; and Rolando, Richard J., to Minnesota Mining and Manufacturing Company. Method for preparing radiation resistant polypropylene articles. 4,931,230, Cl. 264-6.000.

Krul, William R., to Board of Governors for Higher Education, State of Rhode Island and Providence Plantations, The. Vitro propagation of grape via leaf disk culture. 4,931,394, Cl. 435-240.450.

Krumholz, Frank C.; and Jines, Michael D., to Wenger Corporation. Panel assembly and support structure for elevated floors. 4,930,277, Cl. 52-263.000.

Krupp Polysius AG: *See*—
Ahrens, Norbert; Kluger, Wolfgang; Mihatsch, Joachim-Rudolf; and Rzadki, Hans-Jurgen, 4,930,943, Cl. 406-90.000.

Kryk, Lewis R.: *See*—
Cotter, Terrence; Anderson, Theodore; Gansser, Robert; Kryk, Lewis R.; and Rieple, Theodore R., 4,931,202, Cl. 252-99.000.

Kub, Francis J.; Mack, Ingham A.; and Moon, Keith K., to United States of America, Navy. Programmable analog voltage multiplier circuit means. 4,931,674, Cl. 307-529.000.

Kubo, Masaaki: *See*—
Matsuoka, Noriyuki; and Kubo, Masaaki, 4,931,020, Cl. 439-72.000.

Kubota Ltd.: *See*—
Takei, Terutaka; Morita, Shigeru; Togoshi, Yoshikazu; and Kawahara, Yoshihiro, 4,930,296, Cl. 56-11.300.

Kubota, Satoshi: *See*—
Iryo, Takeaki; Kubota, Satoshi; Sano, Yoshio; Murata, Yoshishige; and Koinuma, Yasumi, 4,930,879, Cl. 350-409.000.

Kucera, Clare H.; Crema, Stefano C.; Roznowski, Michael D.; Konrad, Gerd; and Hartmann, Heinrich, to BASF Corporation. Fluid loss control additives for oil well cementing compositions. 4,931,489, Cl. 523-130.000.

Kuck, Karl-Heinz: *See*—
Fest, Christa; Brandes, Wilhelm; Dutzmann, Stefan; Hanssler, Gerd; and Kuck, Karl-Heinz, 4,931,465, Cl. 514-477.000.

Kudert, Frederick G.; Latreille, Maurice G.; McHenry, Robert J.; Nahill, George F.; Pfutzenreuter, Henry, III; Tennant, William A.; Tung, Thomas T.; and Vella, John, Jr., to American National Can Company. Method for injection molding multi-layer articles. 4,931,246, Cl. 264-241.000.

Kuga, Shigeki: *See*—
Tanaka, Toshiyuki; Kuga, Shigeki; Morishita, Taro; Nakamura, Nobuo; and Ohsaki, Mikio, 4,931,926, Cl. 364-419.000.

Kugimiya, Shuzo; Fukumochi, Yoji; Nakamura, Ichiko; Hirai, Tokuyuki; and Suzuki, Hitoshi, to Sharp Kabushiki Kaisha. Language translation system with means to distinguish between phrases and sentence and number discrminating means. 4,931,936, Cl. 364-419.000.

Kuhlmann, Otto; Sodler, Walter; and Stadler, Eberhard, to Sartorius GmbH. Electronic balance. 4,930,588, Cl. 177-212.000.

Kuhn, John J., to PPG Industries, Inc. High current multiterminal bushing controller. 4,931,075, Cl. 65-1.000.

Kukanskis, Peter E.; and Rhodenizer, Harold, to MacDermid, Incorporated. Method for manufacture of printed circuit boards. 4,931,148, Cl. 204-15.000.

Kulpa, Walter J.: *See*—
Holbrook, Russell W.; Kulpa, Walter J.; and Morabito, James, 4,930,764, Cl. 271-119.000.

Kumar, Shiv R.: *See*—
Kumar, Sudhir; and Kumar, Shiv R., 4,930,600, Cl. 184-3.200.

Kumar, Sudhir; and Kumar, Shiv R., to Tranergy Corporation. Intelligent on-board rail lubication system for curved and tangent track. 4,930,600, Cl. 184-3.200.

Kumasaki, Toshimi: *See*—
Kitahama, Koji; Mishima, Kyoichi; and Kumasaki, Toshimi, 4,931,118, Cl. 156-138.000.

Kumiai Chemical Industry Co., Ltd.: *See*—
Shigematsu, Masahiro; Ohi, Hideo; Kusano, Shoji; Miyazawa, Takeshige; Takahashi, Satoru; Toyokawa, Yasuhumi; and Kajiwara, Ikuo, 4,931,087, Cl. 71-93.000.

Kummer, Rudolf; Merger, Franz; Bertleff, Werner; and Fischer, Rolf, to BASF Aktiengesellschaft. Preparation of adipic acid. 4,931,590, Cl. 562-590.000.

Kundu, Samar K., to Abbott Laboratories. Method and device for ketone measuremest. 4,931,404, Cl. 436-128.000.

Kunihiro, Hideto: *See*—
Koga, Toshio; Ohki, Junichi; Ohta, Mutsumi; and Kunihiro, Hideto, 4,931,879, Cl. 358-335.000.

Kunitani, Michael: *See*—
Halenbeck, Robert; Smith, Flint; and Kunitani, Michael, 4,931,543, Cl. 530-351.000.

Kuno, Atsuhi: *See*—
Takasugi, Hisashi; Kuno, Atsuhi; Sakai, Hiroyoshi; Sugiyama, Yoshie; and Takaya, Takao, 4,931,453, Cl. 514-252.000.

Kunstadt, Robert M. Self-tensioning trussrod system. 4,930,389, Cl. 84-293.000.

Kunstmann, Uwe: *See*—
Henschel, Walter; Riesner, Manfred; and Kunstmann, Uwe, 4,931,243, Cl. 264-109.000.

Kunz, Walter: *See*—
Schurter, Rolf; Kunz, Walter; and Nyfeler, Robert, 4,931,581, Cl. 560-18.000.

Kuo, Frank, to Smiley Chien. Pumping mechanism for dispensing lotion in bottle/container. 4,930,670, Cl. 222-321.000.

Kuraray Company, Ltd.: *See*—
Ogawa, Kunihiko; and Noguchi, Yoshio, 4,931,344, Cl. 428-100.000.
Yoshifumi, Murata; Teruhisa, Kaneda; Kazuo, Hara; Katsunori, Takamoto; Isao, Obonishi; and Shinichi, Yokota, 4,931,538, Cl. 528-292.000.

Kureha Kagaku Kogyo Kabushiki Kaisha: *See*—
Iizuka, Yo; Iwasaki, Takao; Katto, Takayuki; and Shiiki, Zenya, 4,931,516, Cl. 526-62.000.
Okamoto, Tsuneo; and Sakaguchi, Yasuo, 4,931,259, Cl. 422-143.000.
Watanabe, Nobuhiro; and Sakagami, Teruo, 4,931,523, Cl. 526-292.300.

Kurihara, Koichiro: *See*—
Ogata, Yasunobu; Kurihara, Koichiro; Masaka, Mitusuke; and Hatanaka, Kouji, 4,931,619, Cl. 219-270.000.

Kuriyama, Kazuya: *See*—
Amaya, Shinji; Iwanari, Yoshiyuki; Shinzo, Kinji; Kogawara, Toshiro; Yamazaki, Syuuichi; Shimizu, Seiichi; and Kuriyama, Kazuya, 4,931,370, Cl. 430-45.000.

Kuroishi, Kazuo: *See*—
Sonobe, Tadasi; Ueda, Shinjiro; Ikeguchi, Takashi; Matsumoto, Manabu; and Kuroishi, Kazuo, 4,931,744, Cl. 328-235.000.

Kuromatsu, Akio, to Applied Magnetic Lab Co., Ltd. Blade cutting method for hard brittle material. 4,930,486, Cl. 125-11.010.

Kurten, Michael J.: *See*—
Tiegs, Mark D.; and Kurten, Michael J., 4,930,261, Cl. 51-105.0VG.

Kurtz, James H., Jr.: *See*—
Murphy, Peter F.; and Kurtz, James H., Jr., 4,930,652, Cl. 220-90.200.

Kusano, Shoji: *See*—
Shigematsu, Masahiro; Ohi, Hideo; Kusano, Shoji; Miyazawa, Takeshige; Takahashi, Satoru; Toyokawa, Yasuhumi; and Kajiwara, Ikuo, 4,931,087, Cl. 71-93.000.

Kuster, Walter; and Keller, Hans J., to Eltec Instruments, Inc. Domed segmented lens systems. 4,930,864, Cl. 350-167.000.

Kuznetsov, Vladimir M.: *See*—
Voronin, Alexandr V.; Kuznetsov, Vladimir M.; Peregud, Boris P.; and Rusakov, Alexandr I., 4,931,702, Cl. 315-344.000.

Kwak, Won S.: *See*—
Kwiatkowski, Patricia L.; and Kwak, Won S., 4,931,219, Cl. 252-586.000.

Kwang-Wen, Roan. Binder for removable leaves. 4,930,926, Cl. 402-55.000.

Kwiatkowski, Patricia L.; and Kwak, Won S., to PPG Industries, Inc. Photochromic compound and articles containing the same. 4,931,219, Cl. 252-586.000.

Kyocera America, Inc.: *See*—
Yonemasu, Hiro; Shirai, Kiyohide; and Kawamura, Ikunosuke, 4,931,854, Cl. 357-74.000.

Kyohzuka, Takahiro: *See*—
Yamamoto, Koichi; and Kyohzuka, Takahiro, 4,930,375, Cl. 74-866.000.

Kyoob Precision Industry Co., Ltd.: *See*—
Hwang, Long-Shi, 4,931,029, Cl. 446-396.000.

Kyoritsu Glass Mfg., Co., Ltd.: *See*—
Yamamoto, Tokuji, 4,931,078, Cl. 71-67.000.

Kyoshin Kogyo Kaburshiki Kaisha: *See*—
Tokura, Kengi, 4,930,338, Cl. 72-479.000.

L & C Enterprises - USA, Inc.: *See*—
Lancour, Jeff J.; Chouinard, Ronald D.; and Wick, Carl J., 4,930,718, Cl. 242-86.50R.

L and M Radiator, Inc.: *See*—
Janezich, Robert J.; Cedar, Charles E.; and Dosen, Todd G., 4,930,568, Cl. 165-76.000.

La Societe de Recherche Snc Inc.: *See*—
Safi, Bechara F., 4,931,401, Cl. 435-287.000.

La Telemecanique Electrique: *See*—
Bernard, Jacques; and Charrier, Dominique, 4,931,766, Cl. 340-332.000.

Laapotti, Jorma: *See*—
Karvinen, Mikko; and Laapotti, Jorma, 4,931,143, Cl. 162-360.100.

Laboratoires UPSA: *See*—
Bru-Magniez, Nicole; De Cock, Christian; Poupaert, Jacques; De Keyser, Jean-Luc; and Dumont, Pierre, 4,931,584, Cl. 560-190.000.

LaCava, Alberto: *See*—
Kaplan, Robert H.; LaCava, Alberto; Shirley, Arthur I.; and Ringo, Steven M., 4,931,071, Cl. 55-25.000.

Lachaize, Henri, to Automobiles Peugeot; and Automobiles Citroen. Semi-active hydropneumatic suspension device and automotive vehicle equipped with this device. 4,930,807, Cl. 280-707.000.

Lachman, Michael E.: *See*—
Coe, Frederick L.; and Lachman, Michael E., 4,931,039, Cl. 604-53.000.

Lagow, Richard J.: *See*—
Bierschenk, Thomas R.; Juhlke, Timothy J.; Lagow, Richard J.; and Kawa, Hajimu, 4,931,199, Cl. 252-68.000.

Lai, Ta-Wang; Pinschmidt, Robert K., Jr.; and Burgoyne, William F., Jr., to Air Products and Chemicals, Inc. Modified poly(vinyl alcohol) containing morpholinoalkylether groups. 4,931,501, Cl. 525-61.000.

Lai, Ta-Wang: *See*—
Pinschmidt, Robert K., Jr.; and Lai, Ta-Wang, 4,931,194, Cl. 252-8.551.
Laico, Joseph P.; and Molino, Joseph L., to Lincoln Mills, Inc. Surgical shoulder positioning apparatus. 4,930,523, Cl. 128-845.000.
Lailach, Gunter; and Gerken, Rudolf, to Bayer Aktiengesellschaft. Process for the purification and reheating of exhaust gases. 4,931,269, Cl. 423-522.000.
L'air Liquide, Societe Anonyme pour l'etude et l'exploitation des Procedes Georges Claude: *See*—
Lermuzeaux, Andre; and Barthelmes, Patrice, 4,931,232, Cl. 264-28.000.
Lalezari, Farzin; Munson, Michael G.; and Cronin, Theresa A., to Ball Corporation. Embedded surface wave antenna. 4,931,808, Cl. 343-753.000.
Laliberte, David R. Small animal washing device. 4,930,453, Cl. 119-158.000.
Lamb, Joseph M.: *See*—
Baty, Kurt F.; and Lamb, Joseph M., 4,931,922, Cl. 364-200.000.
Lamb Robo Inc.: *See*—
Obrecht, Robert E.; and Waltonen, Edward J., 4,930,203, Cl. 29-243.500.
Lambe, John J.: *See*—
Ramesham, Rajeshuni; Thakoor, Anilkumar P.; and Lambe, John J., 4,931,763, Cl. 338-22.0SD.
Lambert, Claude; Pepin, Regis; and Latorse, Marie-Pascale, to Rhone-Poulenc Agrochimie. Fungicidal oxime nicotinates. 4,931,456, Cl. 514-318.000.
Lambert, Nicole: *See*—
Economopoulos, Marios; and Lambert, Nicole, 4,931,159, Cl. 204-208.000.
Lamberts, Wilhelm; Sommerfeld, Klaus-Dieter; Bielefeldt, Dietmar; Marhold, Albrecht; and Negele, Michael, to Bayer Aktiengesellschaft. Use of 1,1,1,4,4,4-hexaefluorobutane as a blowing and insulating gas for the production of foam plastics. 4,931,482, Cl. 521-131.000.
LaMont, David G.; LaMont, Madeline A.; and Donnell, Richard T. Illuminated address identifier and alarm device. 4,931,780, Cl. 340-691.000.
LaMont, Madeline A.: *See*—
LaMont, David G.; LaMont, Madeline A.; and Donnell, Richard T., 4,931,780, Cl. 340-691.000.
Lamster, Ira B.: *See*—
Silver, Frederick H.; and Lamster, Ira B., 4,931,386, Cl. 435-23.000.
Lancour, Jeff J.; Chouinard, Ronald D.; and Wick, Carl J., to L & C Enterprises - USA, Inc. Fencing dispenser. 4,930,718, Cl. 242-86.50R.
Landers, Jerry L., to SerVend International, Inc. Ice dispensing apparatus and method. 4,930,685, Cl. 222-370.000.
Lane, Andrew R.; and Sproul, Richard M., to Otis Engineering Corporation. Dual hydraulic set packer. 4,930,573, Cl. 166-120.000.
Lang, Gerard; Maignan, Jean; Restle, Serge; and Shroot, Braham, to L'Oreal. Benzonorbornene derivatives, processes for their preparation and medicinal and cosmetic compositions containing them. 4,931,589, Cl. 562-490.000.
Lang, Gunther; Konrad, Eugen; Wendel, Harald; Maresch, Gerhard; and Lenz, Hans-Rudi, to Wella Aktiengesellschaft. Cosmetic compostions based upon N-hydroxybutyl-chitosans, N-hydroxybutyl-chitosans as well as processes for the production thereof. 4,931,271, Cl. 424-47.000.
Langdon, Paul J.: *See*—
Fisher, Frank B.; and Langdon, Paul J., 4,930,979, Cl. 415-58.400.
Lange, Roger W.: *See*—
Wood, Thomas E.; and Lange, Roger W., 4,931,414, Cl. 501-103.000.
Langenfeld, Joseph W.; and Westendorf, Neal W., to Westendorf Mfg. Co., Inc. Extender for a tractor loader. 4,930,974, Cl. 414-631.000.
Langenstein, Max, to Max Langenstein Feld- und Gartengerate GmbH & Co. Hand tool, especially a gardening, farm, cleaning, or like implement. 4,930,933, Cl. 403-330.000.
Langer, Hartford P. Rail lift gate apparatus and storage scheme. 4,930,969, Cl. 414-540.000.
Langlais, Christian: *See*—
Bonneyrat, Alain; and Langlais, Christian, 4,930,991, Cl. 417-18.000.
Langsam, Michael: *See*—
Burgoyne, William F., Jr.; Langsam, Michael; Ford, Michael E.; and Casey, Jeremiah P., 4,931,182, Cl. 210-500.390.
Lanius, Charles; and Gilbertson, Mark, to Columbia Parcar Corp. Golf cart or the like. 4,930,591, Cl. 180-65.100.
Lapcevic, Thomas G. Variable resistance weight lifting exercise apparatus. 4,930,768, Cl. 272-117.000.
LaPorta, Frank C.: *See*—
Baral, Elliott; Brown, Percy B.; Hauptman, Reuben D.; Jaeger, Richard J., Jr.; LaPorta, Frank C.; Lauber, Pamela J.; LeCronier, Richard E.; Nelson, Randall H.; Russell, Thomas L., Jr.; and Ying, Wen-Ping, 4,932,042, Cl. 379-67.000.
Laros, Timothy J., to Envirotech Corporation. Flocculating agent combinations for mineral slime filtration systems. 4,931,190, Cl. 210-710.000.
LaRosa, Joseph P.; and Pisa, Gina. Coating applicator with rotatable flow control. 4,930,922, Cl. 401-281.000.
Larson, Daniel H.: *See*—
Davidson, Wayne A.; and Larson, Daniel H., 4,932,050, Cl. 379-211.000.
Larsson, Kare V.: *See*—
Ekman, Bo M.; Larsson, Kare V.; Lindahl, Ake R.; and Rothman, Ulf S. E., 4,931,284, Cl. 424-450.000.
Lasch, Jonathan G.: *See*—
Haynes, Ronald L.; Hoelscher, Charles H.; and Lasch, Jonathan G., 4,931,220, Cl. 252-586.000.
Laschober, Brian J. Eyeglasses with releasable headband support arrangement. 4,930,885, Cl. 351-156.000.
Laskowski, Donald R.; and Tekulve, Daniel R., to Wood-Mizer Products, Inc. Sawmill with hydraulically actuated components. 4,930,386, Cl. 83-399.000.
Laszlo, Sandor: *See*—
Pelyva, Jeno ; Soptei, Csaba; Kolonics, Zoltan; Karacsonyi, Bela; Balint, Sandor; Benczik, Janosne ; Kayos, Csaba; Lendvai, Laszlo ; and Laszlo, Sandor, 4,931,585, Cl. 562-17.000.
Latilla Holdings (Guernsey) Limited: *See*—
Maud, John R.; and Cooper, Allan S., 4,931,804, Cl. 346-93.000.
Latorse, Marie-Pascale: *See*—
Lambert, Claude; Pepin, Regis; and Latorse, Marie-Pascale, 4,931,456, Cl. 514-318.000.
Latreille, Maurice G.: *See*—
Kudert, Frederick G.; Latreille, Maurice G.; McHenry, Robert J.; Nahill, George F.; Pfutzenreuter, Henry, III; Tennant, William A.; Tung, Thomas T.; and Vella, John, Jr., 4,931,246, Cl. 264-241.000.
Latta, Michael D.: *See*—
Jincks, Danny C.; and Latta, Michael D., 4,931,768, Cl. 340-473.000.
Latty, James A.; and Eisenbarth, Spencer, to Dresser Industries, Inc. Steam generating system. 4,930,454, Cl. 122-4.00D.
Latz, Rudolf: *See*—
Scherer, Michael; Latz, Rudolf; and Patz, Ulrich, 4,931,169, Cl. 204-298.110.
Lauber, Pamela J.: *See*—
Baral, Elliott; Brown, Percy B.; Hauptman, Reuben D.; Jaeger, Richard J., Jr.; LaPorta, Frank C.; Lauber, Pamela J.; LeCronier, Richard E.; Nelson, Randall H.; Russell, Thomas L., Jr.; and Ying, Wen-Ping, 4,932,042, Cl. 379-67.000.
Laucht, Horst: *See*—
Albrecht, Hans; Reiniger, Siegfried; Lauer, Wolfgang; Spies, Hans; Laucht, Horst; and Spies, Martin, 4,931,767, Cl. 340-425.500.
Laudal, Dennis L.: *See*—
Miller, Stanley J.; and Laudal, Dennis L., 4,931,073, Cl. 55-96.000.
Lauer, Wolfgang: *See*—
Albrecht, Hans; Reiniger, Siegfried; Lauer, Wolfgang; Spies, Hans; Laucht, Horst; and Spies, Martin, 4,931,767, Cl. 340-425.500.
Laurenzo, Kathleen S., to Ethyl Corporation. Process for preparing hydroxylated amines. 4,931,596, Cl. 564-477.000.
Laurin, Andre , to Locklace Industries Ltd. Slip resistant shoe lace. 4,930,196, Cl. 24-715.300.
Lauter, Jonathan M., to Deere & Company. Apex seal with filled aperture. 4,931,001, Cl. 418-113.000.
LaVahn, Bruce A., to Minnesota Scientific, Inc. Quick release attachment mechanism. 4,930,932, Cl. 403-325.000.
Lavender, William J., to Eastman Kodak Company. Pressure switch having internal vent chamber. 4,931,601, Cl. 200-83.00N.
Lavoie, Michel; and Gendron, Gaetan, to Machinerie Ideale Cie Ltee. Curved conveyor. 4,930,617, Cl. 198-692.000.
Lawlor, Michael J.: *See*—
Gartland, Albert J., Jr.; and Lawlor, Michael J., 4,931,024, Cl. 439-856.000.
Lawrence, Lawrence D.: *See*—
McKenzie, Lee F.; and Lawrence, Lawrence D., 4,931,110, Cl. 149-2.000.
Lawrence, Richard P., to Luitpold Pharmaceuticals, Inc. Stabilized aqueous leucovorin calcium compositions. 4,931,441, Cl. 514-249.000.
Lawrence, Robert S. Staple remover with adjustable leverage. 4,930,749, Cl. 254-28.000.
Lax, Michael, to Autronic Plastics, Inc. Bag apparatus for supporting plastic bags and the like. 4,930,735, Cl. 248-101.000.
Layton, Derek G.; Smith, Alan M.; Fisher, John H.; Pettigrew, Robert M.; and Petty-Saphon, Satham, to Ares-Serono N.V. Optical assay technique. 4,931,384, Cl. 435-7.000.
LeBlanc, Kenneth, to Rule Industries, Inc. Magnetic compass. 4,930,224, Cl. 33-355.00D.
Lecerf, Michel J. M.; and Longuet, Raynald M. G., to Briot International. Glasses frame carrier for a reproducing machine. 4,930,952, Cl. 409-130.000.
LeCourt, William N., to Cooper Industries, Inc. Distribution line switchgear control with isolated cascaded power supplies. 4,931,896, Cl. 361-73.000.
LeCronier, Richard E.: *See*—
Baral, Elliott; Brown, Percy B.; Hauptman, Reuben D.; Jaeger, Richard J., Jr.; LaPorta, Frank C.; Lauber, Pamela J.; LeCronier, Richard E.; Nelson, Randall H.; Russell, Thomas L., Jr.; and Ying, Wen-Ping, 4,932,042, Cl. 379-67.000.
Lee Company, The: *See*—
Grillo, John L., 4,930,553, Cl. 137-508.000.
Lee, Fred C.: *See*—
Jovanovic, Milan; Farrington, Richard; and Lee, Fred C., 4,931,716, Cl. 323-285.000.
Lee, Hseuh C.: *See*—
Bafford, Richard A.; Faircloth, George E.; and Lee, Hseuh C., 4,931,495, Cl. 524-460.000.
Lee, Joseph K.: *See*—
Geyer, Joel Erwin; Lee, Joseph K.; Norman, Vernon R.; and Wilson, Kenneth T., 4,932,023, Cl. 370-85.400.
Lee, Jyh H.: *See*—
Chen, Harlin; and Lee, Jyh H., 4,930,526, Cl. 131-290.000.

Lee, Robert H.; Levran, Alexander; Mak, Chi; Smith, Gerald L.; and Marcinkowski, Jacek J., to Teledyne Inet. Synchronous motor torque control device. 4,931,715, Cl. 318-709.000.

Lee, William C., to PacTel Corporation. Cellular telephone system. 4,932,049, Cl. 379-60.000.

Leeds, Dennis, to Equitable Bag Co., Inc. Plastic bag construction. 4,931,033, Cl. 493-195.000.

Leemans, Daniel L.: *See*—
Love, Mahlon L.; and Leemans, Daniel L., 4,930,590, Cl. 180-55.000.

Leep, James L.: *See*—
Beeman, John A.; Leep, James L.; Marvin, Wayne S.; Solt, Floyd R.; and Smith, Troy P., 4,930,977, Cl. 414-790.800.

Lefler, Kenneth A.: *See*—
Hernandez, Walter C.; Page, Edward A.; and Lefler, Kenneth A., 4,931,949, Cl. 364-497.000.

Legatti, Raymond, to Technology Research Corporation. Ground fault current interrupter circuit with arcing protection. 4,931,894, Cl. 361-45.000.

Legierse, Petrus E. J.; and van der Hoorn, Gustaaf H. A., to U.S. Philips Corporation. Method of manufacturing a metal matrix. 4,931,147, Cl. 204-5.000.

Lehnhoff, Richard N.: *See*—
Disser, Robert J.; and Lehnhoff, Richard N., 4,931,707, Cl. 318-293.000.

Lehr, Erich, to Boehringer Ingelheim KG. Agent with an antidepressant activity. 4,931,435, Cl. 514-211.000.

Leidecker, Henry A.; and Woerman, Gary R., to J. I. Case Company. Lubrication system for a transmission mechanism. 4,930,601, Cl. 184-6.120.

Leifeld, Ferdinand, to Trutzschler GmbH & Co. KG. Apparatus for feeding a fiber lap to a fiber processing machine. 4,930,190, Cl. 19-105.000.

Leitner, Georg: *See*—
Haag, Ernst; Haag, Gunter; Leitner, Georg; and Farnbauer-Schmidt, Konrad, 4,931,794, Cl. 341-31.000.

Lekven, Nils C.: *See*—
Olsen, Terje; Lekven, Nils C.; and Hartai, Julius, 4,931,730, Cl. 324-209.000.

Leleu, Jean-Bernard, to Roquette Freres. Method and installation for the preparation of anhydrous crystalline dextrose. 4,931,101, Cl. 127-60.000.

Lemarchand, Jean-Louis, to Aluminium Pechiney. Process for continuous regulation of the power with which pastes intended for the fabrication of carbonaceous agglomerates are mixed. 4,931,212, Cl. 252-502.000.

Lemmer, Helmut; and Risthaus, Josef, to Square D Starkstrom GmbH. Contactor and/or circuit breaker. 4,931,757, Cl. 335-131.000.

Lenco, Inc.: *See*—
Herbst, Donald J.; Fay, Richard D.; Frericks, David L.; and Blair, Bruce A., 4,931,018, Cl. 434-234.000.

Lendvai, Laszlo : *See*—
Pelyva, Jeno ; Soptei, Csaba; Kolonics, Zoltan; Karacsonyi, Bela; Balint, Sandor; Benczik, Janosne ; Kayos, Csaba; Lendvai, Laszlo ; and Laszlo, Sandor, 4,931,585, Cl. 562-17.000.

Lenox Institute for Research, Inc.: *See*—
Krofta, Milos, 4,931,175, Cl. 210-86.000.

Lensch, Cornelia: *See*—
Kleinstuck, Roland; Lensch, Cornelia; Immenkeppel, Michael; Block, Hans-Dieter; and Odenbach, Herbert, 4,931,586, Cl. 562-24.000.

Lenz, Hans-Rudi: *See*—
Lang, Gunther; Konrad, Eugen; Wendel, Harald; Maresch, Gerhard; and Lenz, Hans-Rudi, 4,931,271, Cl. 424-47.000.

Leonard, Robert R., to Milliken Research Corporation. Camouflage construction. 4,931,320, Cl. 428-17.000.

Lermuzeaux, Andre; and Barthelmes, Patrice, to L'air Liquide, Societe Anosyme pour l'etude et l'exploitation des Procedes Georges Claude. Cooling process for a continuously extruded product. 4,931,232, Cl. 264-28.000.

Lesher, Thomas. Apparatus and method for removing debris from granular material. 4,931,173, Cl. 209-138.000.

Leshik, Richard R.; Dean, Jill P.; and Krimm, Dagmar, to Kraft General Foods, Inc. Aseptically-packaged, aspartame-containing puddings. 4,931,302, Cl. 426-548.000.

Lesko, Camille A.: *See*—
Nelson, William W.; Lesko, Camille A.; Kennedy, Andrew M., II; and Dunn, Vernon E., 4,931,753, Cl. 333-161.000.

L'Esperance, Francis A., Jr., to L'Esperance Medical Technologies, Inc. Method and apparatus for enhanced vascular or other growth. 4,931,053, Cl. 606-2.000.

L'Esperance Medical Technologies, Inc.: *See*—
L'Esperance, Francis A., Jr., 4,931,053, Cl. 606-2.000.

Lessard, Robert J.: *See*—
Stierman, Roger J.; and Lessard, Robert J., 4,931,149, Cl. 204-15.000.

Lester, Mark. Tire repair kit. 4,930,377, Cl. 81-15.200.

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Laico, Joseph P.; and Molino, Joseph L., 4,930,523, Cl. 128-845.000.

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Lowe, Barrie G.; and Tyrrell, Stuart G. J., 4,931,650, Cl. 250-397.000.

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Akabane, Yasuhiro; Tamura, Takamitsu; and Fujiwara, Masami, 4,931,562, Cl. 546-19.000.

Lipe, J. Tom: *See*—
Titsworth, Raymond; Lipe, J. Tom; Dale, James L.; Monroe, Hanford D.; and Hill, Jerry M., 4,931,964, Cl. 364-559.000.

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Schoonheere, Marnix J.; Lippens, Christiaan A. C.; and Naaktgeboren, Adrianus. 4,930,410, Cl. 100-3.000.
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Hardtke, Hans-Herlof, 4,930,732, Cl. 248-62.000.
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Wegener, Peter; Feldhues, Michael; and Litterer, Heinz, 4,931,568, Cl. 549-6.000.
Little, Robert. Material handling vehicles. 4,930,972, Cl. 414-549.000.
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Symons, Robert S.; and Kirshner, Mark F., 4,931,694, Cl. 315-3.500.
Symons, Robert S., 4,931,695, Cl. 315-5.390.
Liu, Jack M. S.: *See*—
Chow, David G. L.; and Liu, Jack M. S., 4,932,001, Cl. 365-233.500.
Liu, Leland L.; Heffelfinger, Michael T.; and Whyman, Donald G., to Mobil Oil Corporation. White opaque opp film for tamper evident package. 4,931,327, Cl. 428-36.500.
Liu, Su H. Shoe sole structure. 4,930,231, Cl. 36-30.00A.
Liverani, Maurizio, to Algotek, Inc. Earpiece for auditory testing of infants. 4,930,520, Cl. 128-746.000.
Livingston, William S. Arthritis treatment with hypoxanthine. 4,931,431, Cl. 514-46.000.
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Embrey, Montyn; and Graham, Neil B., 4,931,288, Cl. 424-486.000.
Lo, Jack. Self-adjusting headset-handset combination. 4,932,052, Cl. 379-430.000.
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Locklace Industries Ltd.: *See*—
Laurin, Andre , 4,930,196, Cl. 24-715.300.
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Dickau, Ewald F.; and Breault, John P., 4,930,669, Cl. 222-309.000.
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Klaus, Michael; Loeliger, Peter; and Weiser, Harald, 4,931,458, Cl. 514-354.000.
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Logan, Joseph N.: *See*—
Broadwin, Alan; Vassallo, Charles; Logan, Joseph N.; and Hornlein, Robert W., 4,931,047, Cl. 604-22.000.
Logsdon, Duane D., to Logsdon Foundation. Pipe holders. 4,930,733, Cl. 248-56.000.
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Logsdon, Duane D., 4,930,733, Cl. 248-56.000.
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Brenner, Karl-Heinz; Huang, Alan; and Lohmann, Adolf W., 4,931,959, Cl. 364-525.000.
Lohr Industrie: *See*—
Jean-Luc, Andre, 4,930,800, Cl. 280-446.100.
Lohse, Jurgen. Covering for large, heavy objects in particular military equipment. 4,930,557, Cl. 150-166.000.
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Longman, Rodney K., to Pylon Manufacturing Corporation. Windshield wiper blade. 4,930,180, Cl. 15-250.420.
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Lecerf, Michel J. M.; and Longuet, Raynald M. G., 4,930,952, Cl. 409-130.000.
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Meul, Thomas, 4,931,570, Cl. 549-62.000.
Loo, George D. H. Scalpel blade holder. 4,930,220, Cl. 30-339.000.
Loos, Rolf: *See*—
Mester, Roland; Loos, Rolf; Heitmann, Jurgen; and Muller, Jurgen, 4,931,885, Cl. 360-48.000.
Lopez, George A., to ICU Medical, Inc. Medical device. 4,931,048, Cl. 604-110.000.
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Grollier, Jean-Francois; Cotteret, Jean; and Rosembaum, Georges, 4,931,066, Cl. 8-410.000.
Gueret, Jean-Louis, 4,930,919, Cl. 401-126.000.
Lang, Gerard; Maignan, Jean; Restle, Serge; and Shroot, Braham, 4,931,589, Cl. 562-490.000.
Saint-Leger, Didier; and Bague, Arlette, 4,931,467, Cl. 514-529.000.
Love, Mahlon L.; and Leemans, Daniel L., to Deere & Company. Motor and transmission assembly. 4,930,590, Cl. 180-55.000.
Lowe, Alan T.: *See*—
Lowe, Martin C.; and Lowe, Alan T., 4,930,243, Cl. 43-17.000.
Lowe, Barrie G.; and Tyrrell, Stuart G. J., to Link Analytical Limited. X-ray detectors. 4,931,650, Cl. 250-397.000.
Lowe, H. Edward, Jr.; and Raymond, Marvin L., to Lowe, H. Edward, Jr. Animal litter composition. 4,930,443, Cl. 119-1.000.
Lowe, Martin C.; and Lowe, Alan T. Angling bite detector. 4,930,243, Cl. 43-17.000.
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Freitag, Douglas W., 4,931,241, Cl. 264-86.000.
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Scott, Robert H., 4,930,998, Cl. 417-462.000.
Lucas, Roger C.; Weatherbee, James A.; and Tsang, Monica L.-S., to Techne Corporation. Heterodimer form of transforming growth factor-beta. 4,931,548, Cl. 530-399.000.
Lucht, Charles R.: *See*—
Lucht, Orren J.; and Lucht, Charles R., 4,931,826, Cl. 355-28.000.
Lucht, Eric T.: *See*—
Woodard, Robert W.; Lucht, Eric T.; and Clark, Danny L., 4,930,744, Cl. 248-642.000.
Lucht, Orren J.; and Lucht, Charles R., to Castle Rock Manufacturing, Inc. Photographic printer-processor. 4,931,826, Cl. 355-28.000.
Luck, Thomas R.: *See*—
Hulterstrum, Harold D.; and Luck, Thomas R., 4,930,914, Cl. 400-122.000.
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Baumgarth, Manfred; Gericke, Rolf; Lues, Ingeborg; De Peyer, Jacques; and Bergmann, Rolf, 4,931,454, Cl. 514-254.000.
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Schenker, Gilbert; Piorr, Robert; and Luettge, Sabine, 4,931,218, Cl. 252-551.000.
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Lawrence, Richard P., 4,931,441, Cl. 514-249.000.
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Amor, Hamed; and Luke, Hans-Dieter, 4,931,869, Cl. 358-133.000.
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Emmons, Lawrence D.; Mackley, James S.; Stokes, David H.; Stefenel, Rudolph S.; Brisko, William E., Jr.; and Cooper-Hart, Michael A., 4,932,047, Cl. 379-53.000.
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Rossman, Phillip J.; and Wiener, Scott A., 4,930,511, Cl. 128-661.030.
Luscher, Rene : *See*—
Knecht, Hugo; and Luscher, Rene , 4,931,831, Cl. 355-75.000.
Luton, Michael J.: *See*—
Dismukes, John P.; Luton, Michael J.; and Vallone, Joseph, 4,931,068, Cl. 51-293.000.
Lutsky, Arthur A.: *See*—
Brush, Robert W., Jr.; Scharf, Robert M.; Davie, Campbell; Lutsky, Arthur A.; and Siano, Frank S., 4,930,200, Cl. 29-25.420.
Lutz, John H.: *See*—
Manniso, James L.; Lutz, John H.; and Rinschler, Craig R., 4,931,178, Cl. 210-228.000.
Lutz, Karl. Double-insulated air-cooled electromotor for barrel pump. 4,931,678, Cl. 310-62.000.
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Bartlett, Ian G.; and Lymer, Donald A., 4,931,129, Cl. 156-435.000.
Lynch, Thomas E., to Sonar International, Inc. Apparatus and method for detecting swimmers. 4,932,009, Cl. 367-153.000.
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Katznelson, Ron D., 4,932,055, Cl. 380-4.000.
M. E. Cunningham Company: *See*—
Speicher, Edwin W., 4,930,912, Cl. 400-48.000.
M.L.S. Detroit, Inc.: *See*—
Jacobson, Mark, 4,930,947, Cl. 408-153.000.
MacDermid, Incorporated: *See*—
Kukanskis, Peter E.; and Rhodenizer, Harold, 4,931,148, Cl. 204-15.000.
Macdonald, Kenneth A. B., to Boeing Company, The. Partitioned, fluid supported, high efficiency traveling charge for hyper-velocity guns. 4,930,421, Cl. 102-377.000.
Machado, Daniel. Refuse container caddy apparatus. 4,930,653, Cl. 220-23.400.
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Lavoie, Michel; and Gendron, Gaetan, 4,930,617, Cl. 198-692.000.
MacIntyre, Hazen L.; Graham, Richard D., II; and Aldava, Michael B., to Kaufel Group, Ltd. Battery monitoring system of cell groups and display. 4,931,738, Cl. 324-435.000.
Mack, Daniel R.; Sturtevant, Alfred H.; and Schwartz, Henry L., to Sequoia-Turner Corporation. Apparatus for dilution and measurement in automated immunoassay techniques. 4,931,256, Cl. 422-65.000.
Mack, Ingham A.: *See*—
Kub, Francis J.; Mack, Ingham A.; and Moon, Keith K., 4,931,674, Cl. 307-529.000.
Mackley, James S.: *See*—
Emmons, Lawrence D.; Mackley, James S.; Stokes, David H.; Stefenel, Rudolph S.; Brisko, William E., Jr.; and Cooper-Hart, Michael A., 4,932,047, Cl. 379-53.000.
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Houston, Kevin C. D.; and Popil, Roman E., 4,931,657, Cl. 250-559.000.
MacPhee, John: *See*—
Hara, Akira; and MacPhee, John, 4,930,415, Cl. 101-228.000.
Macy, David F.; and Alsenz, Evert C., to WJM Corporation. Vibratory linear acceleration and angular rate sensing system. 4,930,351, Cl. 73-505.000.
Maddox, Albert F. Apparatus for selecting random numbers. 4,930,779, Cl. 273-144.00B.
Madison, Stephen A.; and Ilardi, Leonora M., to Lever Brothers Company. Oleum sulfonation of phenyl quaternary alkyl ammonium and phosphonium carbonate esters. 4,931,563, Cl. 546-222.000.
Maeda Industries, Ltd.: *See*—
Yamazaki, Toshimasa; Miura, Kazuyuki; and Yamasaki, Kazuto, 4,930,798, Cl. 280-261.000.

Maeda, Takeo; and Makita, Koji, to Kabushiki Kaisha Toshiba. Method for manufacturing integrated bipolar and MOS transistors. 4,931,407, Cl. 437-45.000.
Maenishi, Hiroaki: *See*—
Hayakawa, Hiroshi; Maenishi, Hiroaki; and Okamoto, Kazuo, 4,930,213, Cl. 29-793.000.
Magee, Robert C.: *See*—
Pester, Andrew L.; Mugglestone, Peter R.; and Magee, Robert C., 4,932,067, Cl. 384-45.000.
Maglic, Rastko C., to Honeywell Inc. Glass tube/stainless steel header interface for pressure sensor. 4,930,929, Cl. 403-29.000.
Magma Power Company: *See*—
Bonham, Enos A., Jr., 4,930,316, Cl. 60-641.500.
Magnetek Universal Mfg., Corp.: *See*—
Lobo, Edward M.; and Berman, Michael F., 4,931,900, Cl. 361-315.000.
Magnetic Peripherals Inc.: *See*—
Toffle, Mark A., 4,931,338, Cl. 428-65.000.
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Kobylenski, Dennis E.; and Boehner, Loren W., 4,930,259, Cl. 51-89.000.
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Barlai, Zoltan; Dorcsi, Geza; Rez, Ferenc; and Vamos, Attila, 4,931,736, Cl. 324-367.000.
Mahle, Christoph E.: *See*—
Assal, Francois T.; Evans, John V.; Mahle, Christoph E.; Zaghloul, Amir I.; and Gupta, Ramesh K., 4,931,802, Cl. 342-356.000.
Mahoney, Gregory P., to Eastman Kodak Company. Color copier with constant output rate. 4,931,842, Cl. 355-317.000.
Mahoney, William M., to William-Maher, Inc. Gift wrapping package. 4,930,903, Cl. 383-6.000.
Maignan, Jean: *See*—
Lang, Gerard; Maignan, Jean; Restle, Serge; and Shroot, Braham, 4,931,589, Cl. 562-490.000.
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Lee, Robert H.; Levran, Alexander; Mak, Chi; Smith, Gerald L.; and Marcinkowski, Jacek J., 4,931,715, Cl. 318-709.000.
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Makishima, Kozoh; and Makishima, Kyoko, 4,930,527, Cl. 132-201.000.
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Fushiya, Fusao; Yamazaki, Takashi; and Saito, Mikio, 4,930,583, Cl. 173-109.000.
Makita, Koji: *See*—
Maeda, Takeo; and Makita, Koji, 4,931,407, Cl. 437-45.000.
Malcolm-Brown, Tessa, to Dixon International Limited. Intumescent seals. 4,931,339, Cl. 428-71.000.
Malesci Istituzo Farmacobiologico S.p.A.: *See*—
Fedi, Mauro; Bacciarelli, Carla; and Bonacchi, Graziano, 4,931,437, Cl. 514-234.200.
Malhotra, Sudarshan K.; Dripps, James E.; Bradfisch, Gregory A.; Wollowitz, Susan; and Knox, Ingrid L., to Dow Chemical Company, The. N-cyanomethyl-2-pyridinone insecticides. 4,931,452, Cl. 514-344.000.
Mallard, William C., Jr., to Digital Equipment Corporation. Shorted-coaxial-cable detector for local-area networks. 4,931,791, Cl. 340-825.500.
Mallary, Michael L., to Digital Equipment Corporation. Apparatus and methods to suppress perpendicular fields in longitudinal recording. 4,931,886, Cl. 360-55.000.
Maloney, Michael; and Watson, Linda. Baseball bat. 4,930,772, Cl. 273-26.00B.
Malosh, Edward A.: *See*—
Peelman, Paul L.; and Malosh, Edward A., 4,931,237, Cl. 264-48.000.
Malyniak, Nancy R.; and Meagher, James F., to Robin Hood Multi-foods, Inc. Food preservation process utilizing a blend of acidulants. 4,931,297, Cl. 426-265.000.
Mammato, Donald: *See*—
Spak, Mark A.; Mammato, Donald; Durham, Dana; and Jain, Sangya, 4,931,381, Cl. 430-325.000.
MAN Roland Druckmaschinen AG: *See*—
Kobler, Ingo, 4,930,383, Cl. 83-27.000.
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Wakino, Kikuo; and Mandai, Harufumi, 4,931,354, Cl. 428-209.000.
Manian, Bala S., to Molecular Dynamics. Electrophoresis imaging system. 4,930,893, Cl. 356-344.000.
Manitt, James; and Hull, Scott, to Texas Instruments Incorporated. Thick film copper conductor patterning by laser. 4,931,323, Cl. 427-53.100.
Manley, Robert Q.; and Goodman, Jerome J. Brazing or soldering jig for dental attachments. 4,930,679, Cl. 228-212.000.
Manlove, Gregory J.: *See*—
Marrah, Jeffrey J.; Manlove, Gregory J.; and Kennedy, Richard A., 4,932,058, Cl. 381-13.000.
Mann, Philip, to Grosset & Dunlap, Inc. Stencil book. 4,931,017, Cl. 434-87.000.
Mann, Richard K.: *See*—
Beck, James R.; and Mann, Richard K., 4,931,083, Cl. 71-92.000.
Mannesmann Aktiengesellschaft: *See*—
Steppe, Erich; and Beth, Dieter, 4,930,918, Cl. 400-719.000.
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Dantlgraber, Jorg, 4,930,311, Cl. 60-406.000.
Manning, Douglas E. Apparatus and method for fabricating elliptical tubing. 4,930,331, Cl. 72-396.000.
Manning, Harold J.: *See*—
Hughes, William L.; and Manning, Harold J., 4,931,610, Cl. 219-10.491.
Mansiso, James L.; Lutz, John H.; and Rinschler, Craig R., to W. L. Gore & Associates, Inc. Filter cloth assembly. 4,931,178, Cl. 210-228.000.
Mansukhani, Gul: *See*—
Cherukuri, Subraman R.; and Mansukhani, Gul, 4,931,293, Cl. 426-5.000.
Mantovani, Elis, to Tecnodelta S.A. Device for making a mechanical element integral in rotational movement with a second external, coaxial element by friction. 4,930,956, Cl. 409-233.000.
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Marathon Oil Company: *See*—
Falk, David O., 4,930,575, Cl. 166-295.000.
Marbury, Lynwood E. Vehicle alignment apparatus. 4,930,333, Cl. 72-447.000.
Marcinkowski, Jacek J.: *See*—
Lee, Robert H.; Levran, Alexander; Mak, Chi; Smith, Gerald L.; and Marcinkowski, Jacek J., 4,931,715, Cl. 318-709.000.
Maresch, Gerhard: *See*—
Lang, Guather; Konrad, Eugen; Wendel, Harald; Maresch, Gerhard; and Lenz, Hans-Rudi, 4,931,271, Cl. 424-47.000.
Margolis, Donald L.: *See*—
Krasnicki, Edward J.; and Margolis, Donald L., 4,930,507, Cl. 128-649.000.
Marguier, Gilbert, to Dacral, S.A. Anticorrosion coating composition with improved stability, and coated substrate. 4,931,074, Cl. 148-248.000.
Marhold, Albrecht: *See*—
Lamberts, Wilhelm; Sommerfeld, Klaus-Dieter; Bielefeldt, Dietmar; Marhold, Albrecht; and Negele, Michael, 4,931,482, Cl. 521-131.000.
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Noser, Martin; and Mark, Fritz, 4,930,585, Cl. 175-220.000.
Marker Deutschland GmbH: *See*—
Sedlmair, Gerhard, 4,930,802, Cl. 280-625.000.
Markham, Charles W. Needle/stylet combination. 4,931,059, Cl. 606-185.000.
Marlinski, Edward J. Device for shielding electromagnetic radiation. 4,931,625, Cl. 219-528.000.
Marrah, Jeffrey J.; Manlove, Gregory J.; and Kennedy, Richard A., to Delco Electronics Corporation. Pilot cancellation circuit. 4,932,058, Cl. 381-13.000.
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Miller, Stanley J.; and Laudal, Dennis L., to University of North Dakota School of Engineering & Mines Foundation, The. Process of flue gas conditioning applied to fabric filtration. 4,931,073, Cl. 55-96.000.
Millerhagen, Jay O.: *See*—
Anderson, Catherine A.; and Millerhagen, Jay O., 4,930,519, Cl. 128-671.000.
Milliken Research Corporation: *See*—
Leonard, Robert R., 4,931,320, Cl. 428-17.000.
Millipore Corporation: *See*—
Giuffrida, Anthony J., 4,931,160, Cl. 204-301.000.
Mills, Paul A., to KCAP Manufacturing, Inc. Golf grip training apparatus. 4,930,785, Cl. 273-183.00D.
Minakawa, Masaaki: *See*—
Okamoto, Shinji; Minakawa, Masaaki; Neki, Yoaiti; and Nakagire, Masasi, 4,931,500, Cl. 525-60.000.
Minigrip, Inc.: *See*—
VanErden, Donald L., 4,931,003, Cl. 425-66.000.
Minnesota Mining and Manufacturing Company: *See*—
Asmus, Robert A.; and Duan, Daniel C., 4,931,282, Cl. 424-448.000.
Becker, Dennis L.; Tochacek, Miroslav; and Hansen, Paul E., 4,931,343, Cl. 428-95.000.
Calhoun, Clyde D.; Foss, George D.; Fleming, Maurice J.; and Bruxvoort, Wesley J., 4,930,266, Cl. 51-293.000.
Emslander, Jeffrey O., 4,930,646, Cl. 215-232.000.
Heilmann, Steven M.; Krepski, Larry R.; Moren, Dean M.; Rasmussen, Jerald K.; and Smith, Howell K., II, 4,931,582, Cl. 560-172.000.
Krueger, Dennis L.; Insley, Thomas I.; Meyer, Daniel E.; and Rolando, Richard J., 4,931,230, Cl. 264-6.000.
Wood, Thomas E.; and Lange, Roger W., 4,931,414, Cl. 501-103.000.
Minnesota Scientific, Inc.: *See*—
LaVahn, Bruce A., 4,930,932, Cl. 403-325.000.
Minolta Camera Kabushiki Kaisha: *See*—
Fujita, Masafumi; Saijo, Takao; and Terzuka, Kazuhiko, 4,931,828, Cl. 355-45.000.
Hamada, Masataka; Ishida, Tokuji; and Akada, Yasuaki, 4,931,821, Cl. 354-402.000.
Kamo, Makoto; and Nakajima, Isamu, 4,931,816, Cl. 354-64.000.
Morikawa, Takashi, 4,931,960, Cl. 364-519.000.
Tadauchi, Yukio, 4,931,875, Cl. 358-300.000.
Mintel, Thomas E.: *See*—
Misevich, Kenneth W.; and Mintel, Thomas E., 4,931,356, Cl. 428-283.000.
Mirkovic, Zivorad. Multiple chucking fixture. 4,930,760, Cl. 269-99.000.
Mirsky, Barry: *See*—
Verby, Stanley M.; and Mirsky, Barry, 4,930,275, Cl. 52-200.000.
Mise, Takaya: *See*—
Miya, Shinya; Yoshimura, Takashi; Mise, Takaya; and Yamazaki, Hiroshi, 4,931,417, Cl. 502-117.000.
Misevich, Kenneth W.; and Mintel, Thomas E., to Colgate-Palmolive Company. Sheet material. 4,931,356, Cl. 428-283.000.
Mishima, Kyoichi: *See*—
Kitahama, Koji; Mishima, Kyoichi; and Kumasaki, Toshimi, 4,931,118, Cl. 156-138.000.
Mita Industrial Co., Ltd.: *See*—
Matsushita, Tetsuya; and Nakakuma, Akira, 4,931,836, Cl. 355-233.000.
Mita, Kikuo: *See*—
Matsui, Nobuhiko; and Mita, Kikuo, 4,931,881, Cl. 358-466.000.
Mitchell, LaDonne; Yargus, Larry D.; Volk, Leon W.; and Volk, William A., to Mitchell, LaDonne; and Yargus, Larry D. Method and apparatus for mixing liquid or dry materials. 4,930,900, Cl. 366-168.000.
Mitchell, Monte C., to B & H Manufacturing Company, Inc. Straight through labelling machine. 4,931,122, Cl. 156-215.000.
Mitsubishi Denki Kabushiki Kaisha: *See*—
Fujimoto, Takanori; and Hara, Toshirou, 4,930,481, Cl. 123-481.000.
Hata, Yasuaki; Yasukawa, Takeshi; and Onishi, Masayoshi, 4,931,728, Cl. 324-207.150.
Higashisaka, Norio, 4,931,669, Cl. 307-448.000.
Kako, Hajime, 4,930,482, Cl. 123-488.000.
Kikuda, Shigeru; Yamada, Michihiro; and Miyamoto, Hiroshi, 4,931,668, Cl. 307-443.000.
Kobayashi, Hiroshi; and Suda, Shinji, 4,931,790, Cl. 340-825.640.
Morishita, Akira; and Odawara, Kazuhiro, 4,931,663, Cl. 290-48.000.
Murai, Ryuichi; and Kobayashi, Kenzo, 4,931,951, Cl. 364-513.000.
Murata, Shigemi; and Ohashi, Yutaka, 4,931,719, Cl. 323-368.000.
Okasaka, Yasuhiko; and Ogawa, Toshiyuki, 4,931,995, Cl. 365-189.050.
Sugiyama, Takeshi, 4,931,680, Cl. 310-83.000.
Sumita, Mitsutaka, 4,931,614, Cl. 219-69.120.
Toda, Haruhisa; Fujiwara, Kouhei; Hosogai, Setsuo; and Shioguchi, Kazumi, 4,931,602, Cl. 200-144.00R.
Toko, Yoshio, 4,932,072, Cl. 455-76.000.
Tsukamoto, Katsuhiro; Shimizu, Masahiro; and Miyatake, Hiroshi, 4,931,897, Cl. 361-313.000.
Umeki, Tsunenori, 4,931,999, Cl. 365-230.010.
Usui, Akaru; and Tsukahara, Hiroshi, 4,931,616, Cl. 219-121.680.
Watanabe, Kenji; Uyama, Tadao; Satomi, Norio; Nishikawa, Masahiro; Yamaguchi, Satorou; and Nakazawa, Ichiro, 4,931,251, Cl. 376-128.000.
Yoshitake, Kunitoshi; Tsujita, Yoshihiro; and Kakuta, Nobuyuki, 4,930,694, Cl. 224-42.45R.
Mitsubishi Jidosha Kogyo Kabushiki Kaisha: *See*—
Akai, Setsukazu; and Sawayama, Minoru, 4,930,610, Cl. 192-7.000.
Mitsubishi Jukogyo Kabushiki Kaisha: *See*—
Sato, Hiroshi; and Shimizu, Eiichi, 4,930,713, Cl. 242-58.600.
Mitsubishi Kasei Corporation: *See*—
Hosoi, Hisataka; Endo, Hozumi; Ando, Tatsuo; and Shoji, Mamoru, 4,931,239, Cl. 264-63.000.
Wada, Keisuke; Hara, Yoshinori; and Sasaki, Koushi, 4,931,573, Cl. 549-325.000.
Yamamoto, Masao, 4,930,851, Cl. 350-96.100.
Mitsubishi Metal Corporation: *See*—
Arai, Tatsuo; Saito, Takayoshi; Tsujimura, Osamu; and Hayashizaki, Hiroaki, 4,930,945, Cl. 407-40.000.
Mitsubishi Paper Mills Limited: *See*—
Ishiguro, Mamoru; and Kawai, Akira, 4,931,422, Cl. 503-214.000.
Makishima, Hideo, 4,931,123, Cl. 156-234.000.
Mitsubishi Petrochemical Company Limited: *See*—
Fujita, Takashi, 4,931,517, Cl. 526-128.000.
Goh, Atsushi; Endo, Keiji; and Yamamoto, Yuri, 4,931,088, Cl. 71-100.000.
Mitsubishi Rayon Engineering Co., Ltd.: *See*—
Yamamoto, Tokuji, 4,931,078, Cl. 71-67.000.
Mitsubishi Rayon Kabushiki Kaisha: *See*—
Enomoto, Kanehiko; Ryuno, Koitchiro; and Shimizu, Hitoshi, 4,931,391, Cl. 435-188.000.
Mitsuboshi Belting Ltd.: *See*—
Kitahama, Koji; Mishima, Kyoichi; and Kumasaki, Toshimi, 4,931,118, Cl. 156-138.000.
Mitsui Petrochemical Industries, Ltd.: *See*—
Yoshitake, Junichi; Kitani, Hiroaki; Muranaka, Takeshi; Mizuno, Akira; and Kashiwa, Norio, 4,931,526, Cl. 526-336.000.
Mitsui Toatsu Chemicals, Inc.: *See*—
Asano, Makoto; Tsutsumi, Haruki; Tanaka, Eishi; Fuseya, Yoshiro; Hasegawa, Kiyoharu; and Akahori, Hiroyuki, 4,931,420, Cl. 503-205.000.
Iimuro, Shigeru; Morimoto, Yoshio; and Kitamura, Takashi, 4,931,146, Cl. 203-92.000.
Tamai, Shoji; Ohta, Masahiro; Kawashima, Saburo; Iiyama, Katsuaki; Oikawa, Hideaki; and Yamaguchi, Akihiro, 4,931,531, Cl. 528-172.000.
Mitsuishi, Naoki; Matsubara, Kiyoshi; Takamori, Yoh; and Ozawa, Yoshiyuki, to Hitachi Ltd. Semiconductor memory having storage buffer to save control data during bulk erase. 4,931,997, Cl. 365-218.000.
Mitsumune, Toshifumi; Take, Hiroshi; and Nakazawa, Kiyoshi, to Sharp Kabushiki Kaisha. Liquid crystal display device. 4,930,874, Cl. 350-333.000.
Mitsumura, Satoshi: *See*—
Kashiwagi, Mayumi; Sasaki, Toshiaki; Mitsumura, Satoshi; and Kato, Masayoshi, 4,930,707, Cl. 241-5.000.
Mitsuru, Kuwasawa: *See*—
Ikeda, Yoshiaki; and Mitsuru, Kuwasawa, 4,931,709, Cl. 318-567.000.
Mitten, Robert T.: *See*—
Fleenor, J. Jerome; Chance, Christopher N.; and Mitten, Robert T., 4,930,344, Cl. 73-49.300.
Miura, Kazuyuki: *See*—
Yamazaki, Toshimasa; Miura, Kazuyuki; and Yamasaki, Kazuto, 4,930,798, Cl. 280-261.000.
Miya, Shinya; Yoshimura, Takashi; Mise, Takaya; and Yamazaki, Hiroshi, to Chisso Corporation; and Institute of Physical & Chemical Research, The. Transition-metal compound having a bis-substituted-cyclopentadienyl ligand of bridged structure. 4,931,417, Cl. 502-117.000.
Miyabe, Shuichi: *See*—
Anzawa, Norio; Yazaki, Hisashi; Adachi, Kozi; Watanabe, Naoki; Miyabe, Shuichi; and Kitazawa, Kozo, 4,931,108, Cl. 148-18.000.
Miyagawa, Ichiro; and Arai, Noboru, to Fuji Photo Film Co., Ltd. Light beam scanning device. 4,930,869, Cl. 350-6.800.
Miyagawa, Kenji: *See*—
Kano, Mitsuru; Miyagawa, Kenji; Yamaguchi, Masahiko; and Imaizumi, Eiji, 4,930,877, Cl. 350-339.00F.
Miyahara, Naomasa; Nakamura, Hiroyuki; and Ohsaki, Takashi, to Nikkiso Co., Ltd. Method for adding additives during manufacture of carbon fiber. 4,931,233, Cl. 264-29.200.
Miyakawa, Akira, to Canon Kabushiki Kaisha. Cursor movement control key switch. 4,931,781, Cl. 340-706.000.
Miyake, Katsuya; and Hirobe, Yoshiaki, to Akebono Brake Industry Co. Anti-lock control apparatus. 4,930,846, Cl. 303-111.000.

Miyake, Osamu: *See*—
Kawata, Shoji; Miyake, Osamu; Suzumura, Nobuyasu; and Takeuchi, Motohide, 4,931,939, Cl. 364-426.040.
Miyamae, Fumihiko: *See*—
Nakahashi, Sumio; Miyamae, Fumihiko; and Seike, Nobuki, 4,931,227, Cl. 264-1.900.
Miyamoto, Hiroshi: *See*—
Kikuda, Shigeru; Yamada, Michihiro; and Miyamoto, Hiroshi, 4,931,668, Cl. 307-443.000.
Miyaoka, Mitsuhiko: *See*—
Mori, Hideshi; Kato, Hisaaki; Miyaoka, Mitsuhiko; and Yamaguchi, Hiroshi, 4,930,303, Cl. 57-328.000.
Miyasaka, Masao: *See*—
Watahiki, Shinichi; Itoh, Nobuhiko; and Miyasaka, Masao, 4,930,917, Cl. 400-690.000.
Miyashiro, Stanley K.; Morris, Francis E.; and Roome, Albert T., to United States of America, Secretary the Navy. Pulse interference canceler of high power out-of-band pulse interference signals. 4,932,039, Cl. 375-102.000.
Miyatake, Hiroshi: *See*—
Tsukamoto, Katsuhiro; Shimizu, Masahiro; and Miyatake, Hiroshi, 4,931,897, Cl. 361-313.000.
Miyauchi, Yuji, to Olympus Optical Co., Ltd. Graded refractive index lens. 4,930,880, Cl. 350-413.000.
Miyawaki, Masanao: *See*—
Toyoda, Kenichi; Torii, Nobutoshi; Mizuno, Hitoshi; and Miyawaki, Masanao, 4,931,617, Cl. 219-125.100.
Miyazaki, Nobuyuki; Unoki, Masao; and Munekata, Seiji, to Asahi Glass Company Ltd. Coating composition. 4,931,505, Cl. 525-125.000.
Miyazaki, Takeshi; and Fukui, Tetsuro, to Canon Kabushiki Kaisha. Information recording medium. 4,931,337, Cl. 428-64.000.
Miyazawa, Seiichi; and Ohtsuka, Mitsuru, to Canon Kabushiki Kaisha. Semiconductor laser having a lateral p-n junction utilizing inclined surface and method of manufacturing same. 4,932,033, Cl. 372-46.000.
Miyazawa, Takeshige: *See*—
Shigematsu, Masahiro; Ohi, Hideo; Kusano, Shoji; Miyazawa, Takeshige; Takahashi, Satoru; Toyokawa, Yasuhumi; and Kajiwara, Ikuo, 4,931,087, Cl. 71-93.000.
Mizota, Hisakazu: *See*—
Kojima, Shinji; Matsukawa, Toshitane; Mizota, Hisakazu; Yuhara, Susumu; Yoshimoto, Yoshio; Fujimura, Toshio; and Ito, Kunihiro, 4,930,207, Cl. 29-527.500.
Mizukami, Koichiro: *See*—
Tokunaga, Takafumi; Tsuneoka, Masatoshi; and Mizukami, Koichiro, 4,931,410, Cl. 437-189.000.
Mizukoshi, Masahito: *See*—
Kato, Yukihiro; Kawasaki, Eishi; and Mizukoshi, Masahito, 4,930,353, Cl. 73-727.000.
Mizuno, Akira: *See*—
Yoshitake, Junichi; Kitani, Hiroaki; Muranaka, Takeshi; Mizuno, Akira; and Kashiwa, Norio, 4,931,526, Cl. 526-336.000.
Mizuno, Hitoshi: *See*—
Toyoda, Kenichi; Torii, Nobutoshi; Mizuno, Hitoshi; and Miyawaki, Masanao, 4,931,617, Cl. 219-125.100.
Mizuno, Shigeo, to Yamaha Corporation. Racket frame. 4,930,778, Cl. 273-73.000.
Mizuno, Shigeru: *See*—
Suzuki, Makoto; Mizuno, Shigeru; Sangyoji, Kazuo; and Takagi, Osamu, 4,931,825, Cl. 355-20.000.
Mizuno, Yoshikazu: *See*—
Mori, Sanae; Sakamoto, Masaaki; Wada, Takuo; Mizuno, Yoshikazu; and Sato, Masakazu, 4,930,910, Cl. 384-276.000.
MK Industries: *See*—
Murphy, Peter F.; and Kurtz, James H., Jr., 4,930,652, Cl. 220-90.200.
Mobil Oil Corporation: *See*—
Dessau, Ralph M.; and Valyocsik, Ernest W., 4,931,416, Cl. 502-74.000.
Liu, Leland L.; Heffelfinger, Michael T.; and Whyman, Donald G., 4,931,327, Cl. 428-36.500.
Sharpa, Gordon V., Jr., 4,930,905, Cl. 383-75.000.
Mochizuki, Hidehiro: *See*—
Uemura, Hiroyuki; Suzuki, Akira; Shimada, Masaru; and Mochizuki, Hidehiro, 4,931,423, Cl. 503-227.000.
Modulex, Inc.: *See*—
Papesch, Peter P., 4,930,273, Cl. 52-79.100.
Mohan, Paul, to Environmental Research Institute of Michigan. Reversible high density electrical connector apparatus. 4,931,021, Cl. 439-285.000.
Mohri, Motoo: *See*—
Tajima, Yoshimitsu; and Mohri, Motoo, 4,931,240, Cl. 264-81.000.
Moist, Stanford C., Jr.: *See*—
Haddock, John T.; Miller, Charles A.; Moist, Stanford C., Jr.; Nauman, Warren D.; and Pala, Ronald S., 4,930,209, Cl. 29-592.100.
Molecular Dynamics: *See*—
Manian, Bala S., 4,930,893, Cl. 356-344.000.
Molerus, Otto O.; and Wirth, Karl-Ernst, to Rheinische Braunkohlenwerke AG. Process and apparatus for the treatment of granular solid materials in a fluidized layer. 4,931,260, Cl. 422-147.000.
Molino, Joseph L.: *See*—
Laico, Joseph P.; and Molino, Joseph L., 4,930,523, Cl. 128-845.000.
Monell Chemical Senses Center: *See*—
Cutler, Winnifred B.; Preti, George; and Huggins, George R., 4,931,403, Cl. 436-65.000.
Monitoring Technology Corporation: *See*—
Hernandez, Walter C.; Page, Edward A.; and Lefler, Kenneth A., 4,931,949, Cl. 364-497.000.
Monma, Mitsuru: *See*—
Kobayashi, Shoichi; Mikuni, Katsuhiko; Monma, Mitsuru; Takano, Toshiya; Hara, Kozo; and Hashimoto, Hitoshi, 4,931,389, Cl. 435-95.000.
Monroe, Hanford D.: *See*—
Titsworth, Raymond; Lipe, J. Tom; Dale, James L.; Monroe, Hanford D.; and Hill, Jerry M., 4,931,964, Cl. 364-559.000.
Monsanto Company: *See*—
Pfohl, William F., 4,931,536, Cl. 528-250.000.
Pfohl, William F., 4,931,537, Cl. 528-250.000.
Monson, Clifford L.; Perry, Danny C.; Domay, Theodor; and Wilks, Henry A. Compact self-contained recycling extraction cleaner. 4,930,178, Cl. 15-320.000.
Monte, Woodrow C., to Boatwright, Doyle W., a part interest. Antimicrobial food composition. 4,931,300, Cl. 426-335.000.
Monte, Woodrow C. Dietary vaccine for inhibiting metabolism of methanol. 4,931,432, Cl. 514-54.000.
Montedison S.p.A.: *See*—
Corradini, Paolo; De Rosa, Claudio; Guerra, Gaetano; Nicolais, Luigi; Petraccone, Vittorio; and Attalla, Giancarlo, 4,931,325, Cl. 428-35.700.
Montgomery, Curtis J.; Patel, Chimanbhai P.; and Shetty, Jayarama K., to Miles Inc. Method for removing antifoaming agents during processing of microbial fermentations. 4,931,397, Cl. 435-243.000.
Montoye, Robert K.: *See*—
Cook, Peter W.; and Montoye, Robert K., 4,931,970, Cl. 364-715.080.
Cook, Peter W.; and Montoye, Robert K., 4,931,971, Cl. 364-715.080.
Montres Rado S.A.: *See*—
Meister, Leonhard, 4,930,304, Cl. 59-80.000.
Moody, Roy A.: *See*—
Turek, James A.; and Moody, Roy A., 4,930,548, Cl. 140-93.400.
Moody, Taryn S., to AT&T Bell Laboratories. Path learning feature for an automated telemarketing system. 4,932,021, Cl. 370-54.000.
Moon, Francis C., to Cornell Research Foundation, Inc. Magnetic flexure system for determining superconductive properties of a sample. 4,931,732, Cl. 324-228.000.
Moon, Jack E.: *See*—
Feichtmeir, Raymond A.; Cothrell, LeRoy E.; Moon, Jack E.; and Turner, Ted R., 4,931,113, Cl. 156-64.000.
Moon, Keith K.: *See*—
Kub, Francis J.; Mack, Ingham A.; and Moon, Keith K., 4,931,674, Cl. 307-529.000.
Mooney, Charles W.: *See*—
Rollins, Thomas J.; Mooney, Charles W.; and Nguyen, Tuan K., 4,931,765, Cl. 340-407.000.
Moore, Stephen J. Fabric tailgate for a pickup truck. 4,930,834, Cl. 296-50.000.
Moore, Victor S.: *See*—
Rhodes, Joseph C., Jr.; Moore, Victor S.; Kraft, Wayne R.; and Barrs, John W., 4,931,989, Cl. 364-900.000.
Moose Products, Inc.: *See*—
Phillips, Kirk B.; and Kastan, Peter, 4,931,769, Cl. 340-541.000.
Morabito, James: *See*—
Holbrook, Russell W.; Kulpa, Walter J.; and Morabito, James, 4,930,764, Cl. 271-119.000.
Moreau, Christian: *See*—
Grillon, Jean; and Moreau, Christian, 4,931,874, Cl. 358-231.000.
Morel, Claude: *See*—
Sevrin, Mireille; George, Pascal; and Morel, Claude, 4,931,449, Cl. 514-291.000.
Moren, Dean M.: *See*—
Heilmann, Steven M.; Krepski, Larry R.; Moren, Dean M.; Rasmussen, Jerald K.; and Smith, Howell K., II, 4,931,582, Cl. 560-172.000.
Morflex Chemical Compay, Inc.: *See*—
Hull, Ezekiel H.; and Frappier, Edward P., 4,931,583, Cl. 560-180.000.
Morgan, Burton D. Self-adhesive bandage. 4,930,500, Cl. 128-156.000.
Morgan, Noredin H., to Chomerics, Inc. Foam in place conductive polyurethane foam. 4,931,479, Cl. 521-76.000.
Mori, Hideshi; Kato, Hisaaki; Miyaoka, Mitsuhiko; and Yamaguchi, Hiroshi, to Murata Kikai Kabushiki Kaisha. Spinning apparatus. 4,930,303, Cl. 57-328.000.
Mori, Sanae; Sakamoto, Masaaki; Wada, Takuo; Mizuno, Yoshikazu; and Sato, Masakazu, to Honda Giken Kogyo Kabushiki Kaisha. Bearing arrangement. 4,930,910, Cl. 384-276.000.
Morigaki, Masakazu; Kawagishi, Toshio; Nakazyo, Kiyoshi; Seto, Nobuo; and Kamei, Sadao, to Fuji Photo Film Co., Ltd. Silver halide color photographic light-sensitive material. 4,931,382, Cl. 430-512.000.
Morikawa, Takashi, to Minolta Camera Kabushiki Kaisha. Character image generator for storing images in a landscape and potrait orientation. 4,931,960, Cl. 364-519.000.
Morimoto, Akira, to Asahi Kogaku Kogyo Kabushiki Kaisha. Scanning optical system for use in laser beam printer. 4,930,850, Cl. 350-6.800.
Morimoto, Yasuto: *See*—
Nakao, Toru; Morita, Kenji; Obata, Minoru; and Morimoto, Yasuto, 4,931,443, Cl. 514-252.000.

Morimoto, Yoshio: *See*—
Iimuro, Shigeru; Morimoto, Yoshio; and Kitamura, Takashi, 4,931,146, Cl. 203-92.000.
Morinaga & Co., Ltd.: *See*—
Kimura, Norio, 4,931,398, Cl. 435-252.500.
Morioka, Kimihiko, to Rittaishashinzo Co., Ltd. Stereophotographic process and processing apparatus for producing works of sculpture. 4,931,817, Cl. 354-113.000.
Morishita, Akira; and Odawara, Kazuhiro, to Mitsubishi Denki Kabushiki Kaisha. Starter motor. 4,931,663, Cl. 290-48.000.
Morishita, Taro: *See*—
Tanaka, Toshiyuki; Kuga, Shigeki; Morishita, Taro; Nakamura, Nobuo; and Ohtaki, Mikio, 4,931,926, Cl. 364-419.000.
Morita, Kenji: *See*—
Nakao, Toru; Morita, Kenji; Obata, Minoru; and Morimoto, Yasuto, 4,931,443, Cl. 514-252.000.
Morita, Shigeru: *See*—
Takei, Terutaka; Morita, Shigeru; Togoshi, Yoshikazu; and Kawahara, Yoshihiro, 4,930,296, Cl. 56-11.300.
Morita, Tatsuo: *See*—
Nanyoshi, Yasutoshi; Matsumura, Toshio; Morita, Tatsuo; and Shigyo, Hidetoshi, 4,930,477, Cl. 123-422.000.
Morizzo, Nicholas L., to Krantz America, Inc. Automatic defect cutting assembly for a continuous fabric winder. 4,930,711, Cl. 242-56.00R.
Morris, Francis E.: *See*—
Miyashiro, Stanley K.; Morris, Francis E.; and Roome, Albert T., 4,932,039, Cl. 375-102.000.
Morris, Jack W.: *See*—
Klueh, David R.; Morris, Jack W.; Urdahl, Kent G.; and Zimmer, Matthew K., 4,931,348, Cl. 428-207.000.
Morrison, Donald R. Quick disassembly screed construction. 4,931,008, Cl. 425-456.000.
Morton International, Inc.: *See*—
Wardle, Robert B.; Hinshaw, Jerald C.; and Hajik, Robert M., 4,931,112, Cl. 149-88.000.
Morton Thiokol, Inc.: *See*—
Solberg, Mark A., 4,930,541, Cl. 137-875.000.
Mosehauer, Michael: *See*—
Higgins, Joanne M.; and Mosehauer, Michael, 4,931,835, Cl. 355-203.000.
Moser, John B., to North American Roto-Molding Corp. Refuse container with molded hinge. 4,930,649, Cl. 220-1.00T.
Moser, Wayne A., to Sentry Technologies, Inc. Method and apparatus for aeration of stored grain with proactive cooling. 4,930,229, Cl. 34-34.000.
Mosiewicz, Antonio, to Cofimco S.r.l. Fixed-angle keying piece for blades of axial fans. 4,930,989, Cl. 416-204.00R.
Motegi, Ryohei; Takeuchi, Shinichi; and Sato, Toshio, to Tokyo Keiki Co., Ltd. Method of and apparatus for measuring flow velocity by using ultrasonic waves. 4,930,358, Cl. 73-861.280.
Motoo, Satoshi: *See*—
Watanabe, Masahiro; Motoo, Satoshi; and Furuya, Nagakazu, 4,931,168, Cl. 204-284.000.
Motorola, Inc.: *See*—
Anderson, Dale R., 4,931,921, Cl. 363-163.000.
Gray, Randall C.; and Jarrett, Robert, 4,931,717, Cl. 323-299.000.
McDermott, Mark W.; and Fourcroy, Antone L., 4,931,748, Cl. 331-1.00A.
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Burba, Christian; and Mrotzek, Werner, 4,931,529, Cl. 528-94.000.
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Ritter, John A.; Tomaka, Jan Z.; and Muda, Jozes A., 4,930,427, Cl. 105-406.100.
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Kersten, Siegfried; Jaeger, Karl-Friedrich; Koenig, Karl-Heinz; Mueller, Albrecht; Pawliczek, Josef B.; Recker, Hans-Gert; Rohr, Wolfgang; and Wigger, August, 4,931,466, Cl. 514-490.000.
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Dillard, Homer E.; VanHoogstrate, John A.; and Muffler, Ronald J., 4,931,859, Cl. 358-60.000.
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Pester, Andrew L.; Mugglestone, Peter R.; and Magee, Robert C., 4,932,067, Cl. 384-45.000.
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Mester, Roland; Loos, Rolf; Heitmann, Jurgen; and Muller, Jurgen, 4,931,885, Cl. 360-48.000.
Muller-Sybrichs, Manfred: *See*—
Krimmel, Heinz; Muller-Sybricha, Manfred; Schilling, Rolf; and Weller, Ulrich, 4,931,229, Cl. 264-3.300.
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Connor, David T.; Mullican, Michael D.; Sorenson, Roderick J.; and Thueson, David O., 4,931,459, Cl. 514-381.000.
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Steiner, Karl; Mullner, Josef; Schiel, Christian; and Flamig, Hans, 4,931,142, Cl. 162-358.000.
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Miyazaki, Nobuyuki; Unoki, Masao; and Munekata, Seiji, 4,931,505, Cl. 525-125.000.
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Baba, Takeaki; Nanba, Keizo; Takeshima, Yoshio; Sano, Hiromichi; Tobita, Koji; Muneto, Atsuo; Hara, Toshihiro; and Fujise, Kazuki, 4,931,340, Cl. 428-73.000.
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Lalezari, Farzin; Munson, Michael G.; and Cronin, Theresa A., 4,931,808, Cl. 343-753.000.
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Roche, Pascal; and Muoy, Yin H., 4,930,215, Cl. 29-830.000.
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Murakami, Yasuo; Matsumoto, Youichi; and Uemura, Kazuhiro, to Nippon Seiko Kabushiki Kaisha. Rolling bearing. 4,930,909, Cl. 384-492.000.
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Yoshitake, Junichi; Kitani, Hiroaki; Muranaka, Takeshi; Mizuno, Akira; and Kashiwa, Norio, 4,931,526, Cl. 526-336.000.
Murata Kikai Kabushiki Kaisha: *See*—
Kawarabashi, Tsukasa, 4,930,301, Cl. 57-80.000.
Mori, Hideshi; Kato, Hisaaki; Miyaoka, Mitsuhiko; and Yamaguchi, Hiroshi, 4,930,303, Cl. 57-328.000.
Yamamoto, Yoshio; and Hiraoka, Hiroshi, 4,930,302, Cl. 57-281.000.
Murata Manufacturing Co., Ltd.: *See*—
Shikama, Takashi; Wakabayashi, Asami; and Torii, Kiyofumi, 4,931,626, Cl. 219-540.000.
Wakino, Kikuo; and Mandai, Harufumi, 4,931,354, Cl. 428-209.000.
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Iryo, Takeaki; Kubota, Satoshi; Sano, Yoshio; Murata, Yoshishige; and Koinuma, Yasumi, 4,930,879, Cl. 350-409.000.
Murayama, Hisao: *See*—
Tomita, Masami; Kawabata, Toshiyasu; Nanya, Toshiki; and Murayama, Hisao, 4,931,374, Cl. 430-106.000.
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Yamamoto, Tohru; Takeo, Tadashi; Ichinose, Kiyohiro; Ozawa, Syogo; Fujii, Kenji; Fujii, Saburo; Enomoto, Mashayuki; Ishibashi, Ichiro; and Murayama, Junichi, 4,931,322, Cl. 427-421.000.
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Murrill, William D.; and Rhodes, Mark W., to 501 Sky Climber, Inc. Scissors lift apparatus. 4,930,598, Cl. 182-63.000.
Murthy, Kuchi S.: *See*—
Song, Suk-Zu; Mehta, Surendra C.; Murthy, Kuchi S.; Nesbitt, Russell U.; and Fawzi, Mahdi B., 4,931,519, Cl. 526-258.000.
Myers, Albert: *See*—
Ford, John E.; and Myers, Albert, 4,930,703, Cl. 239-424.000.
Myers, Michael O., to Dow Chemical Company, The. Poly(alkylene carbonate) polyols as antistatic additives for polyurethanes. 4,931,486, Cl. 521-159.000.
Naaktgeboren, Adrianus, to Ford New Holland, Inc. Apparatus for density control in rectangular balers to improve the bale tying operation. 4,930,411, Cl. 100-4.000.
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Schoonheere, Marnix J.; Lippens, Christiaan A. C.; and Naaktgeboren, Adrianus, 4,930,410, Cl. 100-3.000.
Nadeau, Patricia B. Notching scissors to notch and trim curved seams. 4,930,219, Cl. 30-230.000.

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Sugawara, Katuo; Takahashi, Akio; Katagiri, Junichi; Nagai, Akira; Ono, Masahiro; and Narahara, Toshikazu, 4,931,507, Cl. 525-193.000.

Nagano, Masashi, to Shimano Industrial Company Limited. Speed change operating device for a bicycle. 4,930,368, Cl. 74-475.000.

Nagasawa, Hidehiko, to Koito Seisakusho Co., Ltd. Perpendicularly intersecting gear device. 4,930,367, Cl. 74-416.000.

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Nakayama, Tadayoshi; Sato, Chikara; Nagasawa, Kenichi; Sasatani, Tomohiko; Yoshimura, Katsuji; Takahashi, Koji; and Kozuki, Susumu, 4,932,066, Cl. 382-56.000.

Nagasawa, Naobumi; Houshi, Teruo; and Arai, Hiroyuki, to Sanyo Electric Co., Ltd. Integrated circuit for generating indexing data in a CD player. 4,932,018, Cl. 369-59.000.

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Nagashima, Toshiaki: *See*—
Ban, Yutaka; and Nagashima, Toshiaki, 4,931,838, Cl. 355-260.000.

Nagata, Syoichi; and Ohashi, Kunio, to Sharp Kabushiki Kaisha. Image glazing device. 4,931,618, Cl. 219-216.000.

Nagell, Bernt, to Norsk Hydro a.s. Pneumatic dosimeter. 4,930,691, Cl. 222-630.000.

Naghshineh, Kianoosh, to Advanced Micro Devices, Inc. ECL-to-TTL translator circuit with ground bounce protection. 4,931,673, Cl. 307-475.000.

Nagle, Elliott V., Jr.: *See*—
Cullo, Leonard A.; Nagle, Elliott V., Jr.; Restelli, Edward F., Jr.; and Yogan, Thomas J., 4,931,418, Cl. 502-218.000.

Nagler, Michael: *See*—
Succari, Shmuel; Gilad, Shalev; Nagler, Michael; Beiber, Avigdor; and Berman, Dov, 4,931,637, Cl. 250-235.000.

Nahill, George F.: *See*—
Kudert, Frederick G.; Latreille, Maurice G.; McHenry, Robert J.; Nahill, George F.; Pfutzenreuter, Henry, III; Tennant, William A.; Tung, Thomas T.; and Vella, John, Jr., 4,931,246, Cl. 264-241.000.

Naik, Subhash K.; and Fiedler, Louis J., to Avco Corporation. Method for imparting erosion-resistance to metallic substrate. 4,931,152, Cl. 204-38.500.

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Naitou, Katsumi, to Nippon Tsushin Densen Company Ltd. Non-stationary antenna with sleeve and resonant circuit. 4,931,807, Cl. 343-745.000.

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Fukaya, Masaki; Kawakami, Soichiro; Itabashi, Satoshi; Terada, Katsunori; Gofuku, Ihachiro; Nakagawa, Katsumi; Hatanaka, Katsunori; Isobe, Yoshinori; Saika, Toshihiro; Kaneko, Tetsuya; Kitahara, Nobuko; and Suzuki, Hideyuki, 4,931,661, Cl. 250-578.100.

Nakagawa, Satoshi: *See*—
Sugita, Shuichi; Nakagawa, Satoshi; and Shimada, Naoko, 4,931,383, Cl. 430-551.000.

Nakagawa, Yoshitomo: *See*—
Sato, Mitsuyoshi; Kaito, Takashi; and Nakagawa, Yoshitomo, 4,930,439, Cl. 118-723.000.

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Okamoto, Shinji; Minakawa, Masaaki; Neki, Youiti; and Nakagire, Masasi, 4,931,500, Cl. 525-60.000.

Nakaguit, Osamu: *See*—
Kamiya, Takashi; Saito, Yoshihisa; Teraji, Tsutomu; Nakaguit, Osamu; Oku, Teruo; Nakamura, Hitoshi; and Hashimcto, Masashi, 4,931,555, Cl. 540-222.000.

Nakahama, Ryoji; and Yamazaki, Toshiyuki, to Sanshin Kogyo Kabushiki Kaisha. Tilting device for outboard engine. 4,931,027, Cl. 440-53.000.

Nakahashi, Sumio; Miyamae, Fumihiko; and Seike, Nobuki, to Nissan Chemical Industry Co., Ltd. Molding of light reflector. 4,931,227, Cl. 264-1.900.

Nakaishi, Toru: *See*—
Shimizu, Shinkichi; Shoji, Takayuki; Kono, Kanji; and Nakaishi, Toru, 4,931,561, Cl. 544-336.000.

Nakajima, Hiroomi; Itoh, Nobuyuki; and Nihira, Hiroyuki, to Kabushiki Kaisha Toshiba. Method of manufacturing semiconductor device having trench isolation. 4,931,409, Cl. 437-63.000.

Nakajima, Isamu: *See*—
Kamo, Makoto; and Nakajima, Isamu, 4,931,816, Cl. 354-64.000.

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Adachi, Yuuma; Nakajima, Nobuyoshi; and Ishida, Masamitsu, 4,931,644, Cl. 250-327.200.

Nakajima, Yoshihiro, to Nissan Motor Co., Ltd. Power supply circuit for automotive brake lamp. 4,931,697, Cl. 315-77.000.

Nakajima, Yukio; and Hara, Minoru, to Olympus Optical Co., Ltd. Multimode cameras. 4,931,823, Cl. 354-412.000.

Nakakuma, Akira: *See*—
Matsushita, Tetsuya; and Nakakuma, Akira, 4,931,836, Cl. 355-233.000.

Nakamura, Akira: *See*—
Tanaka, Toyoaki; Ohira, Katuzi; Nakamura, Akira; Kamei, Ryosuke; and Hashimoto, Akihiro, 4,931,005, Cl. 425-83.100.

Nakamura, Hiroyuki: *See*—
Miyahara, Naomasa; Nakamura, Hiroyuki; and Ohsaki, Takashi, 4,931,233, Cl. 264-29.200.

Nakamura, Hitoshi: *See*—
Kamiya, Takashi; Saito, Yoshihisa; Teraji, Tsutomu; Nakaguit, Osamu; Oku, Teruo; Nakamura, Hitoshi; and Hashimoto, Masashi, 4,931,555, Cl. 540-222.000.

Nakamura, Ichiko: *See*—
Kugimiya, Shuzo; Fukumochi, Yoji; Nakamura, Ichiko; Hirai, Tokuyuki; and Suzuki, Hitoshi, 4,931,936, Cl. 364-419.000.

Nakamura, Koichiro; and Tanaka, Yoshinori, to Kabushiki Kaisha Toshiba. Portable storage medium. 4,931,623, Cl. 235-488.000.

Nakamura, Kyoichi: *See*—
Shiiki, Hitoshi; Tada, Minoru; and Nakamura, Kyoichi, 4,931,477, Cl. 521-58.000.

Nakamura, Mamoru, to Aisin Seiki Kabushiki Kaisha. Solenoid valve assembly. 4,930,747, Cl. 251-129.170.

Nakamura, Nobuo: *See*—
Tanaka, Toshiyuki; Kuga, Shigeki; Morishita, Taro; Nakamura, Nobuo; and Ohsaki, Mikio, 4,931,926, Cl. 364-419.000.

Nakamura, Shinichi: *See*—
Suwa, Kyoichi; Ushida, Kazuo; Suto, Takeshi; Kameyama, Masaomi; Hirukawa, Shigeru; and Nakamura, Shinichi, 4,931,830, Cl. 355-71.000.

Nakamura, Shogo, to Ricoh Company, Ltd. Noise suppression apparatus. 4,932,063, Cl. 389-94.000.

Nakamura, Takashi, to Fuji Photo Film Co., Ltd. Radiation image recording and reproducing method. 4,931,652, Cl. 250-484.100.

Nakamura, Yuji: *See*—
Takakura, Makoto; Hori, Takahiro; Sakaguchi, Yuriko; and Nakamura, Yuji, 4,931,314, Cl. 427-140.000.

Nakanishi, Yasuhiro; Ikemoto, Yutaka; and Suzuki, Takashi, to Sharp Kabushiki Kaisha. Electronic clinical thermometer. 4,930,222, Cl. 374-170.000.

Nakano, Isamu: *See*—
Yagi, Hisanori; Hamada, Kousuke; Nakano, Isamu; and Nishimura, Yoshihiro, 4,931,359, Cl. 428-325.000.

Nakao, Motokazu; Tojo, Tomotarou; and Tanaka, Kenji, to Sharp Kabushiki Kaisha. Filter change-over mechanism for use in color image reading apparatus. 4,931,862, Cl. 358-75.000.

Nakao, Toru; Morita, Kenji; Obata, Minoru; and Morimoto, Yasuto, to Yoshitomi Pharmaceutical Industries, Ltd. Piperazine compound and pharmaceutical use thereof. 4,931,443, Cl. 514-252.000.

Nakashima, Mitsuyoshi; Kanamaru, Mitsutaka; Sugiyama, Akira; and Terakawa, Masato, to Fujisawa Pharmaceutical Company, Ltd. Uricosuric composition. 4,931,440, Cl. 514-259.000.

Nakatsuji, Sanji, to Sanko Industries Limited. Die for notching hollow tubing. 4,930,384, Cl. 83-54.000.

Nakawaki, Yasunori; Ushijima, Fumihiro; Numazawa, Akio; and Asada, Toshiyuki, to Toyota Jidosha Kabushiki Kaisha. Brake system for automatic transmission. 4,930,373, Cl. 475-128.000.

Nakayama, Tadayoshi; Sato, Chikara; Nagasawa, Kenichi; Sasatani, Tomohiko; Yoshimura, Katsuji; Takahashi, Koji; and Kozuki, Susumu, to Canon Kabushiki Kaisha. Information signal transmission system. 4,932,066, Cl. 382-56.000.

Nakayama, Yasunobu; and Sato, Yasuji, to Kabushiki Kaisha Toshiba. Apparatus for controlling key telephone station set in key telephone system. 4,932,043, Cl. 379-157.000.

Nakazawa, Ichiro: *See*—
Watanabe, Kenji; Uyama, Tadao; Satomi, Norio; Nishikawa, Masahiro; Yamaguchi, Satorou; and Nakazawa, Ichiro, 4,931,251, Cl. 376-128.000.

Nakazawa, Kiyoshi: *See*—
Mitsumune, Toshifumi; Take, Hiroshi; and Nakazawa, Kiyoshi, 4,930,874, Cl. 350-333.000.

Nakazyo, Kiyoshi: *See*—
Morigaki, Masakazu; Kawagishi, Toshio; Nakazyo, Kiyoshi; Seto, Nobuo; and Kamei, Sadao, 4,931,382, Cl. 430-512.000.

Nalco Chemical Company: *See*—
Braden, Michael L.; and Allenson, Stephen J., 4,931,191, Cl. 210-725.000.
Romberger, John A.; Jones, Robert D.; and Carr, Richard P., 4,931,318, Cl. 427-397.700.
Slovinsky, Manuel; and Tarizzo, Jeffrey R., 4,931,347, Cl. 428-192.000.

Namikoshi, Hajime: *See*—
Okamoto, Yoshio; Hatada, Koichi; Shibata, Tohru; Namikoshi, Hajime; and Okamoto, Ichiro, 4,931,184, Cl. 210-635.000.

Nanba, Keizo: *See*—
Baba, Takeaki; Nanba, Keizo; Takeshima, Yoshio; Sano, Hiromichi; Tobita, Koji; Muneto, Atsuo; Hara, Toshihiro; and Fujise, Kazuki, 4,931,340, Cl. 428-73.000.

Nanya, Toshiki: *See*—
Tomita, Masami; Kawabata, Toshiyasu; Nanya, Toshiki; and Murayama, Hisao, 4,931,374, Cl. 430-106.000.

Nanyoshi, Yasutoshi; Matsumura, Toshio; Morita, Tatsuo; and Shigyo, Hidetoshi, to Nissan Motor Company, Limited. System and method for controlling ignition timing for internal combustion engine. 4,930,477, Cl. 123-422.000.

Narahara, Toshikazu: *See*—
Sugawara, Katuo; Takahashi, Akio; Katagiri, Junichi; Nagai, Akira; Ono, Masahiro; and Narahara, Toshikazu, 4,931,507, Cl. 525-193.000.

Narita, Hitoshi: *See*—
Hieda, Teruo; Suzuki, Masao; and Narita, Hitoshi, 4,931,856, Cl. 358-29.000.

Narita, Shinichi: *See*—
Kawagishi, Yoji; Narita, Shinichi; Kiriu, Takashi; and Yamanaka, Schunichiro, 4,931,588, Cl. 562-68.000.

Narumiya, Masao, to Sharp Kabushiki Kaisha. Image data composing system and process for storing both monochrome and polychrome image data. 4,931,860, Cl. 358-75.000.

Naruo, Hatsumi, to Fanuc Ltd. Industrial robot control apparatus. 4,931,711, Cl. 318-568.130.

Nash, Kenneth M., to Packseal Industries Limited. Bundle turning units for use with conveyors. 4,930,615, Cl. 198-411.000.

National Gypsum Company: *See*—
Volk, Joseph; and Taravella, Salvatore R., 4,930,287, Cl. 52-748.000.

National Material Limited Partnership: *See*—
Windgassen, William P., 4,930,257, Cl. 49-504.000.

National Nuclear Corporation: *See*—
Welsh, Luther, 4,931,645, Cl. 250-361.00R.

National Semiconductor corporation: *See*—
Yee, Loren W., 4,931,665, Cl. 307-296.600.

Nauman, Warren D.: *See*—
Haddock, John T.; Miller, Charles A.; Moist, Stanford C., Jr.; Nauman, Warren D.; and Pala, Ronald S., 4,930,209, Cl. 29-592.100.

NCR Corporation: *See*—
Barker, Mark P., 4,931,920, Cl. 363-82.000.
Daniel, Richard A.; Rowson, Stuart C.; Barnhart, James E.; and Paek, Woonsuk, 4,931,986, Cl. 364-900.000.
Feldgajer, Oleg, 4,932,065, Cl. 382-9.000.

NEC Corporation: *See*—
Abe, Mitsue, 4,931,983, Cl. 364-900.000.
Aoki, Yoshitaka, 4,931,884, Cl. 360-26.000.
Koga, Toshio; Ohki, Junichi; Ohta, Mutsumi; and Kunihiro, Hideto, 4,931,879, Cl. 358-335.000.
Tajima, Junji, 4,931,849, Cl. 357-23.600.
Ueda, Hideki, 4,932,073, Cl. 455-113.000.

NEC Home Electronics Ltd.: *See*—
Fujiwara, Shinsuke, 4,930,916, Cl. 400-636.000.
Koga, Toshio; Ohki, Junichi; Ohta, Mutsumi; and Kunihiro, Hideto, 4,931,879, Cl. 358-335.000.

Negele, Michael: *See*—
Lamberts, Wilhelm; Sommerfeld, Klaus-Dieter; Bielefeldt, Dietmar; Marhold, Albrecht; and Negele, Michael, 4,931,482, Cl. 521-131.000.

Negishi, Masataka. Device for changings directions of light rays. 4,930,867, Cl. 350-286.000.

Neidich, Douglas A., to InterCon Systems, Inc. Cam actuated electrical connector. 4,931,022, Cl. 439-310.000.

Neilson, Joseph S.: *See*—
Robinson, Richard P.; and Neilson, Joseph S., 4,931,907, Cl. 361-391.000.

Neki, Youiti: *See*—
Okamoto, Shinji; Minakawa, Masaaki; Neki, Youiti; and Nakagire, Masasi, 4,931,500, Cl. 525-60.000.

Nelson, Bradley H., to Microelectronics and Computer Technology Corporation. Process for preparing integrated circuit dies for mounting. 4,930,216, Cl. 29-854.000.

Nelson, Linda H.: *See*—
Boutni, Omar M.; Nelson, Linda H.; Patterson, Dwight J.; Pratt, Charles F.; and Savenije, Herman B., 4,931,503, Cl. 525-67.000.

Nelson, Lloyd M.: *See*—
Boyer, Billy G.; Nelson, Lloyd M.; Soucie, Wayne L.; and Hayes, William K., 4,930,605, Cl. 188-2.00D.

Nelson, Randall H.: *See*—
Baral, Elliott; Brown, Percy B.; Hauptman, Reuben D.; Jaeger, Richard J., Jr.; LaPorta, Frank C.; Lauber, Pamela J.; LeCronier, Richard E.; Nelson, Randall H.; Russell, Thomas L., Jr.; and Ying, Wen-Ping, 4,932,042, Cl. 379-67.000.

Nelson Research & Development: *See*—
Horn, Alan S.; Jerabek, Paul A.; and Peck, James V., 4,931,270, Cl. 424-1.100.

Nelson, William W.; Lesko, Camille A.; Kennedy, Andrew M., II; and Dunn, Vernon E., to Ford Aerospace Corporation. Coplanar waveguide time delay shifter. 4,931,753, Cl. 333-161.000.

Nenoff, Joseph R. Unified pull-push exercise device. 4,930,769, Cl. 272-120.000.

Nentl, Robert J.: *See*—
Williams, Randall S.; Peterson, Michael D.; and Nentl, Robert J., 4,930,634, Cl. 206-454.000.

Nesbitt, Russell U.: *See*—
Song, Suk-Zu; Mehta, Surendra C.; Murthy, Kuchi S.; Nesbitt, Russell U.; and Fawzi, Mahdi B., 4,931,519, Cl. 526-258.000.

Nestec S.A.: *See*—
Angeloz, Corinne; Huerlimann, Peter; and Van Meir, Eugene, 4,930,690, Cl. 222-490.000.

Nestler, Heinz: *See*—
Barfurth, Dieter; Lindzus, Claus; and Nestler, Heinz, 4,931,094, Cl. 106-20.000.

Netts S.r.l.: *See*—
Bazzano, Guido, 4,930,245, Cl. 43-42.170.

Netzer, Ehud: *See*—
Porat, Itzhak; Rosenberg, Jehuda; Netzer, Ehud; and Netzer, Yishai, 4,930,365, Cl. 74-5.60A.

Netzer, Yishai: *See*—
Porat, Itzhak; Rosenberg, Jehuda; Netzer, Ehud; and Netzer, Yishai, 4,930,365, Cl. 74-5.60A.

Neubauer, Gerald: *See*—
Fuchs, Hugo; Agab, David; Neubauer, Gerald; and Ritz, Josef, 4,931,592, Cl. 564-267.000.

Neubauer, Jean C.: *See*—
Gillen, Wendy N.; Gavin, Laurie N.; and Neubauer, Jean C., 4,930,235, Cl. 40-152.000.

Neubert, Gerhard: *See*—
Auchter, Gerhard; Schwerzel, Thomas; Osterloh, Rolf; Neubert, Gerhard; Pfoehler, Peter; Druschke, Wolfgang; and Jaeger, Helmut, 4,931,494, Cl. 524-460.000.

Neudeck, George W.; and Rieth, Paul H., to Ferro Corporation. Metal melting crucible. 4,931,415, Cl. 501-133.000.

Neurodynamics, Inc.: *See*—
Ghajar, Jamshid B. G.; Hariri, Robert J.; and Ghadjar, Fathali G., 4,931,056, Cl. 606-130.000.

New, Jeffrey A.: *See*—
McCarville, Douglas A.; and New, Jeffrey A., 4,931,126, Cl. 156-304.600.

Newcomb, Nelson F.; and Newcomb, Nelson F., Jr. Game ball. 4,930,776, Cl. 273-58.00B.

Newcomb, Nelson F., Jr.: *See*—
Newcomb, Nelson F.; and Newcomb, Nelson F., Jr., 4,930,776, Cl. 273-58.00B.

Newell, Fredrick J., Jr.: *See*—
Hill, Douglas B.; and Newell, Fredrick J., Jr., 4,930,267, Cl. 51-392.000.

Newman-Evans, Richard H.: *See*—
Qureshi, Shahid P.; Gardner, Hugh C.; and Newman-Evans, Richard H., 4,931,496, Cl. 524-612.000.

Newman, Joseph. Selectively positionable weather vane and display for vertical post. 4,930,436, Cl. 116-264.000.

Newman, Martin H. Iontophoresis drug delivery system. 4,931,046, Cl. 604-20.000.

Newman, Neil A., to Brunswick Corporation. Anti-motion sickness apparatus. 4,930,435, Cl. 114-191.000.

Newton, Arnold C., to Rolls-Royce plc. Ducted fan gas turbine engine with surge controller. 4,930,307, Cl. 60-226.100.

NGK Spark Plug Co., Ltd.: *See*—
Kawamura, Mitsuyoshi; and Taniguchi, Masato, 4,930,546, Cl. 138-149.000.

Ngoc, Danh Le; and Mick, John R., to Integrated Device Technology, Inc. Sixteen-bit programmable pipelined arithmetic logic unit. 4,931,974, Cl. 364-736.000.

Nguyen, Tuan K.: *See*—
Rollins, Thomas J.; Mooney, Charles W.; and Nguyen, Tuan K., 4,931,765, Cl. 340-407.000.

Nguyen, Vietson M.; and Dhyanchand, John J., to Sundstrand Corp. System for converting variable frequency multiple phase alternating current into constant frequency multiple phase alternating current with neutral. 4,931,919, Cl. 363-37.000.

Nicholson, Harlan L.: *See*—
Bode, Robert; and Nicholson, Harlan L., 4,930,350, Cl. 73-597.000.

Nicolais, Luigi: *See*—
Corradini, Paolo; De Rosa, Claudio; Guerra, Gaetano; Nicolais, Luigi; Petraccone, Vittorio; and Attalla, Giancarlo, 4,931,325, Cl. 428-35.700.

Nicolas, Guy: *See*—
Brunisholz, Laurent; and Nicolas, Guy, 4,931,252, Cl. 419-23.000.

Nielsen, Niels J.: *See*—
Cowger, Bruce; Nielsen, Niels J.; and Dion, John H., 4,931,811, Cl. 346-140.00R.

Niemann, Ekkehard: *See*—
Fischer, Roland; Grabe, Gerhard; and Niemann, Ekkehard, 4,931,412, Cl. 437-225.000.

Niesen, Scott M.: *See*—
Borst, Rodney D.; and Niesen, Scott M., 4,930,627, Cl. 206-45.230.

Nihira, Hiroyuki: *See*—
Nakajima, Hiroomi; Itoh, Nobuyuki; and Nihira, Hiroyuki, 4,931,409, Cl. 437-63.000.

Nihon Parkerizing Co., Ltd.: *See*—
Shima, Shizuo; and Koizumi, Soei, 4,931,317, Cl. 427-385.500.

Nikkiso Co., Ltd.: *See*—
Miyahara, Naomasa; Nakamura, Hiroyuki; and Ohsaki, Takashi, 4,931,233, Cl. 264-29.200.

Nikon Corporation: *See*—
Suwa, Kyoichi; Ushida, Kazuo; Suto, Takeshi; Kameyama, Masaomi; Hirukawa, Shigeru; and Nakamura, Shinichi, 4,931,830, Cl. 355-71.000.
Yamano, Shozo, 4,931,822, Cl. 354-402.000.

Niles Parts Co., Ltd.: *See*—
Yamamoto, Harushige, 4,931,714, Cl. 318-663.000.

Nilsson, Bjarne. Filter section for a rotatable filter. 4,931,179, Cl. 210-331.000.

Nimberger, Spencer M., to Precision General, Inc. Portable piston style sample cylinder. 4,930,361, Cl. 73-864.620.

Nippon Chemi-Con Corporation: *See*—
Ando, Susumu; and Hagiwara, Ikuo, 4,931,961, Cl. 361-535.000.

Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha: *See*—
Okamoto, Shinji; Minakawa, Masaaki; Neki, Youiti; and Nakagire, Masasi, 4,931,500, Cl. 525-60.000.

Nippon Kayaku Kabushiki Kaisha: *See*—
Kato, Shoichi; and Hayaoka, Tatsumi, 4,931,474, Cl. 514-708.000.

Nippon Kokan Kabushiki Kaisha: *See*—
Nishio, Hiroaki; and Kawashima, Takeshi, 4,931,238, Cl. 264-62.000.

Nippon Oil Co., Ltd.: *See*—
Yamanashi, Teruaki; Ozawa, Hiroyuki; Yuasa, Hitoshi; Matsuno, Mitsuo; and Satoh, Tetsuo, 4,931,520, Cl. 526-281.000.

Nippon Oil and Fats Co., Ltd.: *See*—
Iryo, Takeaki; Kubota, Satoshi; Sano, Yoshio; Murata, Yoshishige; and Koinuma, Yasumi, 4,930,879, Cl. 350-409.000.
Nippon Seiko Kabushiki Kaisha: *See*—
Murakami, Yasuo; Matsumoto, Youichi; and Uemura, Kazuhiro, 4,930,909, Cl. 384-492.000.
Uchida, Hiroyuki; and Goto, Koichi, 4,930,908, Cl. 384-480.000.
Nippon Shokubai Kagaku Kogyo Co., Ltd.: *See*—
Matsuda, Tatsuhito; Funae, Yasuaki; Yoshida, Masahiro; and Takaya, Tsuguo, 4,931,521, Cl. 526-286.000.
Nippon Soken, Inc.: *See*—
Yamasoue, Kouichi; Akita, Shigeyuki; Tanaka, Hiroaki; Sugitani, Tatsuo; and Inoue, Hideo, 4,931,727, Cl. 324-172.000.
Nippon Steel Corporation: *See*—
Anzawa, Norio; Yazaki, Hisashi; Adachi, Kozi; Watanabe, Naoki; Miyabe, Shuichi; and Kitazawa, Kozo, 4,931,108, Cl. 148-18.000.
Yamada, Teruaki; Ukena, Toshiyasu; Akisue, Osamu; Kawai, Kenji; Sano, Yuuji; and Hayashida, Teruki, 4,931,107, Cl. 148-12.300.
Nippon Tsushin Densen Company Ltd.: *See*—
Naitou, Katsumi, 4,931,807, Cl. 343-745.000.
Nippon Zeon Co., Ltd.: *See*—
Yagishita, Shigeru; Sugimoto, Masatoshi; and Okita, Tomoaki, 4,931,509, Cl. 525-208.000.
Nippondenso Co., Ltd.: *See*—
Kato, Yukihiro; Kawasaki, Eishi; and Mizukoshi, Masahito, 4,930,353, Cl. 73-727.000.
Nishide, Hiroyuki: *See*—
Tsuchida, Eishun; Nishide, Hiroyuki; Yamamoto, Kimihisa; and YHoshida, Shu, 4,931,542, Cl. 528-373.000.
Nishihara, Tokihiro: *See*—
Arakawa, Nobuyuki; Suzuki, Hirotsugu; and Nishihara, Tokihiro, 4,931,313, Cl. 427-164.000.
Nishikawa, Masahiro: *See*—
Watanabe, Kenji; Uyama, Tadao; Satomi, Norio; Nishikawa, Masahiro; Yamaguchi, Satorou; and Nakazawa, Ichiro, 4,931,251, Cl. 376-128.000.
Nishimura, Tetsuharu; Tsukiji, Masaaki; Ishii, Satoshi; and Ishizuka, Koh, to Canon Kabushiki Kaisha. Encoder for forming interference fringes by re-diffracted lights from an optical type scale and photoelectrically converting the interference fringes to thereby detect the displacement of the scale. 4,930,895, Cl. 356-356.000.
Nishimura, Yoshihiro: *See*—
Yagi, Hisanori; Hamada, Kousuke; Nakano, Isamu; and Nishimura, Yoshihiro, 4,931,359, Cl. 428-325.000.
Nishino, Haruo: *See*—
Wakui, Hitoshi; Kiyohara, Nobuo; Nishino, Haruo; and Yamamoto, Osamu, 4,931,263, Cl. 423-215.500.
Nishio, Hiroaki; and Kawashima, Takeshi, to Nippon Kokan Kabushiki Kaisha. Method for manufacturing a sintered body with high density. 4,931,238, Cl. 264-62.000.
Nishiura, Masaharu, to Fuji Electric Co., Ltd. Photoelectric linear image sensor having multilayer insulating layer to reduce defects. 4,931,873, Cl. 358-213.110.
Nishiwaki, Osamu: *See*—
Iwata, Kazuo; Nishiwaki, Osamu; and Tochihara, Shinichi, 4,931,810, Cl. 346-1.100.
Nissan Chemical Industries, Ltd.: *See*—
Baba, Masatoshi; Tanaka, Norio; and Suzuki, Hideo, 4,931,565, Cl. 548-363.000.
Takakura, Makoto; Hori, Takahiro; Sakaguchi, Yuriko; and Nakamura, Yuji, 4,931,314, Cl. 427-140.000.
Nissan Chemical Industry Co., Ltd.: *See*—
Nakahashi, Sumio; Miyamae, Fumihiko; and Seike, Nobuki, 4,931,227, Cl. 264-1.900.
Nissan Motor Co., Ltd.: *See*—
Hayasaki, Koichi, 4,930,313, Cl. 60-454.000.
Ito, Hideki, 4,930,975, Cl. 414-635.000.
Mihara, Teruyoshi, 4,931,846, Cl. 357-23.400.
Nakajima, Yoshihiro, 4,931,697, Cl. 315-77.000.
Nanyoshi, Yasutoshi; Matsumura, Toshio; Morita, Tatsuo; and Shigyo, Hidetoshi, 4,930,477, Cl. 123-422.000.
Sugano, Kazuhiko, 4,930,372, Cl. 475-65.000.
Nissenson, Bilha: *See*—
Shimoni, Yair; and Nissenson, Bilha, 4,930,508, Cl. 128-653.00A.
Nisshin Oil Mills, Ltd., The: *See*—
Kojima, Eiji; Kitagawa, Kiyohiro; and Seto, Akira, 4,931,291, Cl. 426-2.000.
Nitrokemia Ipartelepek: *See*—
Pelyva, Jeno ; Soptei, Csaba; Kolonics, Zoltan; Karacsonyi, Bela; Balint, Sandor; Benczik, Janosne ; Kayos, Csaba; Lendvai, Laszlo ; and Laszlo, Sandor, 4,931,585, Cl. 562-17.000.
Nitto Kagaku Kogyo Kabushiki Kaisha: *See*—
Enomoto, Kanehiko; Ryuno, Koitchiro; and Shimizu, Hitoshi, 4,931,391, Cl. 435-188.000.
Nobles, Eugene R., Jr. Golf putter including signaling device. 4,930,787, Cl. 273-186.00A.
Nobuo, Minematsu: *See*—
Kimura, Haruo; Nobuo, Minematsu; and Shin-ichi, Suto, 4,931,963, Cl. 364-551.010.
Noetzel, Siegfried: *See*—
Mauz, Otto; Noetzel, Siegfried; and Sauber, Klaus, 4,931,476, Cl. 521-34.000.
Noguchi, Yoshio: *See*—
Ogawa, Kunihiko; and Noguchi, Yoshio, 4,931,344, Cl. 428-100.000.
Nogueras Dardina, D. Juan, to Book Covers Inc. Lightweight laminated paperboard. 4,931,346, Cl. 428-182.000.
Nolan, J. Paul: *See*—
Plee, Steven L.; Hartman, Peter; Martin, Jay K.; Nolan, J. Paul; Remboski, Donald J., Jr.; and Ross, Richard R., 4,930,478, Cl. 123-425.000.
Nordenswan, Erik T.: *See*—
Paakkinen, Ilmari; Nordenswan, Erik T.; and Rantanen, Heikki O., 4,930,346, Cl. 73-59.000.
Norman, Vernon R.: *See*—
Geyer, Joel Erwin; Lee, Joseph K.; Norman, Vernon R.; and Wilson, Kenneth T., 4,932,023, Cl. 370-85.400.
Norsk Hydro a.s.: *See*—
Nagell, Bernt, 4,930,691, Cl. 222-630.000.
North American Philips Corporation: *See*—
de Leeuw, Dagobert M.; Zwicker, Walter K.; and Bhargava, Rameshwar N., 4,931,312, Cl. 427-64.000.
North American Roto-Molding Corp.: *See*—
Moser, John B., 4,930,649, Cl. 220-1.00T.
North Carolina State University: *See*—
Klasenhammer, Todd R.; Sanozky, Rosemary B.; and Steenson, Larry R., 4,931,396, Cl. 435-252.300.
North, William E.; Entenmann, David T.; and Donlan, John P., to Westinghouse Electric Corp. Cooled turbine vane. 4,930,980, Cl. 415-115.000.
Northern Engineering Industries PLC: *See*—
Allen, Jeffrey W.; Beal, Peter R.; and Whinfrey, Dennis R., 4,930,430, Cl. 110-264.000.
Northgate Research, Inc.: *See*—
Brisson, Alfred G., 4,930,509, Cl. 128-653.000.
Noser, Martin; and Mark, Fritz, to Hilti Aktiengesellschaft. Device for drilling borehole undercuts. 4,930,585, Cl. 175-220.000.
Novamax Technologies Holdings Inc.: *See*—
Srinivasan, Kollengode V.; Herrington, Leo P.; Basaly, Mores A.; and Poulsen, Harold W., 4,931,151, Cl. 204-376.000.
Novo Industri A/S: *See*—
Sonnewald, Ursula, 4,931,450, Cl. 514-326.000.
Nowak, Michael T.; and Demers, Michael L., to Howtek, Inc. Benzoate inks. 4,931,095, Cl. 106-22.000.
Noyori, Takahiro, to Suzuki Jidosha Kogyo Kabushiki Kaisha. Air-fuel ratio control system. 4,930,480, Cl. 123-440.000.
Nuclear Assurance Corporation: *See*—
Wells, Alan H., 4,930,650, Cl. 220-21.000.
Numa Corporation: *See*—
Williams, Richard E.; and Slimak, Lewis W., 4,930,886, Cl. 353-97.000.
Numazawa, Akio: *See*—
Nakawaki, Yasunori; Ushijima, Fumihiro; Numazawa, Akio; and Asada, Toshiyuki, 4,930,373, Cl. 475-128.000.
Nunuparov, Georgy M.: *See*—
Chernyak, Zinovy A.; Tsvetkov, Alexandr A.; Onischenko, Alexandr M.; Kandala, Anatoly I.; Khrapov, Valery G.; Nunuparov, Georgy M.; Slavinsky, Vladimir M.; Geikhman, Isaak L.; Omelchenko, Nikolai P.; Rafalovich, Boris A.; Silaev, Viktor I.; and Zhdanov, Konstantin F., 4,931,638, Cl. 250-253.000.
Nusmeier, Hendrik W., to Joh. Enschede En Zonen Grafische Inrichting B.V. Identity card. 4,930,814, Cl. 283-109.000.
Ny, Yoshihide, to Ricoh Company, Ltd. File data retrieving system using retrieval-use-image data. 4,931,984, Cl. 364-900.000.
Nyfeler, Robert: *See*—
Schurter, Rolf; Kunz, Walter; and Nyfeler, Robert, 4,931,581, Cl. 560-18.000.
Oakley, Charles D., to General Motors Corporation. Copper core side electrode spark plug shell. 4,931,686, Cl. 313-141.000.
Obara, Kazufumi: *See*—
Takahashi, Fumitaka; Okazaki, Kunio; Shiraishi, Masaru; Takahashi, Masayuki; Obara, Kazufumi; Yorimoto, Koji; and Tanabe, Tohru, 4,930,349, Cl. 73-497.000.
Obata, Minoru: *See*—
Nakao, Toru; Morita, Kenji; Obata, Minoru; and Morimoto, Yasuto, 4,931,443, Cl. 514-252.000.
Obata, Tokio: *See*—
Yoshioka, Hirosuke; Obata, Tokio; Fujii, Katsutoshi; Yoshiya, Haruo; Tsutsumiuchi, Kiyoshi; and Shikita, Shoji, 4,931,455, Cl. 514-256.000.
Obata, Yoshimori; and Toko, Makoto, to Kabushiki Kaisha Toshiba. Multiple-input digital filter. 4,931,972, Cl. 364-724.130.
Obrecht, Robert E.; and Waltonen, Edward J., to Lamb Robo Inc. Clinching tool. 4,930,203, Cl. 29-243.500.
Obu, Makoto: *See*—
Demizu, Hiromi; Obu, Makoto; Yano, Hidetoshi; Seimiya, Ryubun; and Tarumi, Noriyoshi, 4,930,438, Cl. 118-651.000.
Occelli, Mario L., to Union Oil Company of California. Crystalline galliosilicate with the erionite-type structure. 4,931,266, Cl. 423-326.000.
O'Connell, Cormac M.: *See*—
Pfennings, Leonardus C. M. G.; Vosa, Peter H.; O'Connell, Cormac M.; Phelan, Cathal G.; Davies, Thomas J.; and Ontrop, Hans, 4,931,667, Cl. 307-443.000.
Odawara, Kazuhiro: *See*—
Morishita, Akira; and Odawara, Kazuhiro, 4,931,663, Cl. 290-48.000.
Oddenino, Manrico, to ITW-Fastex Italia, S.p.A. Flow diverter for a vehicle heating system. 4,930,540, Cl. 137-599.100.

Odemer, Michael: *See*—
Wolf, Jurgen; Jestadt, Albrecht; Heintke, Hans E.; and Odemer, Michael, 4,930,217, Cl. 30-43.920.
Odenbach, Herbert: *See*—
Kleinstuck, Roland; Lensch, Cornelia; Immenkeppel, Michael; Block, Hans-Dieter; and Odenbach, Herbert, 4,931,586, Cl. 562-24.000.
Oehler, Delbert D.: *See*—
Miller, John A.; and Oehler, Delbert D., 4,930,451, Cl. 119-106.000.
Ogata, Yasunobu; Kurihara, Koichiro; Masaka, Mitusuke; and Hatanaka, Kouji, to Hitachi Metals, Ltd.; and Jidosha Kiki Co., Ltd. Glow plug for diesel engines. 4,931,619, Cl. 219-270.000.
Ogawa, Kumihiko; and Noguchi, Yoshio, to Kuraray Company, Ltd. Fastener component. 4,931,344, Cl. 428-100.000.
Ogawa, Sumitaka; and Hayashi, Tatsuo, to Honda Giken Kogyo Kabushiki Kaisha. Rotational position detector for controlling an internal combustion engine. 4,931,940, Cl. 364-431.030.
Ogawa, Toshiyuki: *See*—
Okasaka, Yasuhiko; and Ogawa, Toshiyuki, 4,931,995, Cl. 365-189.050.
Ogawara, Makoto: *See*—
Kawanishi, Isamu; and Ogawara, Makoto, 4,930,256, Cl. 49-209.000.
Ogihara, Masaki; Okada, Yoshio; and Fujii, Syuso, to Kabushiki Kaisha Toshiba. Semiconductor memory having barrier transistors connected between sense and restore circuits. 4,931,992, Cl. 365-189.110.
Ogino, Hidekazu: *See*—
Igarashi, Saboko; Ogino, Hidekazu; and Hirota, Hajime, 4,931,216, Cl. 252-547.000.
Ogino, Masanori, to Hitachi, Ltd. S-distortion correcting circuit for CRT. 4,931,703, Cl. 315-370.000.
Oguri, Kiyohiko; and Ohkawa, Tsuyoshi, to Yamaha Hatsudoki Kabushiki. Governor for vertical v-type engine. 4,930,476, Cl. 123-376.000.
Ohashi, Kunio: *See*—
Nagata, Syoichi; and Ohashi, Kunio, 4,931,618, Cl. 219-216.000.
Ohashi, Yutaka: *See*—
Murata, Shigemi; and Ohashi, Yutaka, 4,931,719, Cl. 323-368.000.
Ohgoda, Makoto, to Fuji Photo Film Co., Ltd. Radiation image read-out apparatus. 4,931,641, Cl. 250-327.200.
Ohi, Hideo: *See*—
Shigematsu, Masahiro; Ohi, Hideo; Kusano, Shoji; Miyazawa, Takeshige; Takahashi, Satoru; Toyokawa, Yasuhumi; and Kajiwara, Ikuo, 4,931,087, Cl. 71-93.000.
Ohira, Eiji; and Komatsu, Akio, to Hitachi Ltd. User interface system for permitting natural language interaction with an information retrieval system. 4,931,935, Cl. 364-419.000.
Ohira, Katuzi: *See*—
Tanaka, Toyoaki; Ohira, Katuzi; Nakamura, Akira; Kamei, Ryosuke; and Hashimoto, Akihiro, 4,931,005, Cl. 425-83.100.
Ohkawa, Tsuyoshi: *See*—
Oguri, Kiyohiko; and Ohkawa, Tsuyoshi, 4,930,476, Cl. 123-376.000.
Ohki, Junichi: *See*—
Koga, Toshio; Ohki, Junichi; Ohta, Mutsumi; and Kunihiro, Hideto, 4,931,879, Cl. 358-335.000.
Ohmi, Kazuaki: *See*—
Takagi, Hiroshi; Ohmi, Kazuaki; Sugata, Masao; Tsuda, Hisanori; and Ishiwatari, Takahiko, 4,931,692, Cl. 313-503.000.
Ohmura, Hiroshi, to Mazda Motor Corporation. Rear wheel turning system for a vehicle. 4,930,592, Cl. 180-79.100.
Ohsaki, Mikio: *See*—
Tanaka, Toshiyuki; Kuga, Shigeki; Morishita, Taro; Nakamura, Nobuo; and Ohsaki, Mikio, 4,931,926, Cl. 364-419.000.
Ohsaki, Takashi: *See*—
Miyahara, Naomasa; Nakamura, Hiroyuki; and Ohsaki, Takashi, 4,931,233, Cl. 264-29.200.
Ohsuka, Shinji: *See*—
Hiruma, Teruo; and Ohsuka, Shinji, 4,931,647, Cl. 250-368.000.
Ohta, Kazuhiro: *See*—
Uchimura, Shoji; Amano, Hironobu; Ohta, Kazuhiro; Ishiguro, Hirohide; Matsumoto, Takehiko; and Ito, Takuya, 4,931,242, Cl. 264-87.000.
Ohta, Masahiro: *See*—
Tamai, Shoji; Ohta, Masahiro; Kawashima, Saburo; Iiyama, Katsuaki; Oikawa, Hideaki; and Yamaguchi, Akihiro, 4,931,531, Cl. 528-172.000.
Ohta, Mutsumi: *See*—
Koga, Toshio; Ohki, Junichi; Ohta, Mutsumi; and Kunihiro, Hideto, 4,931,879, Cl. 358-335.000.
Ohta, Yoshiro; and Yoshizako, Mamoru. Process for the production of trialkoxysilanes. 4,931,578, Cl. 556-470.000.
Ohtsuka, Mitsuru: *See*—
Miyazawa, Seiichi; and Ohtsuka, Mitsuru, 4,932,033, Cl. 372-46.000.
Ohtsuki, Tomonari; Inoue, Takakatsu; and Tanaka, Yoshiaki, to Daiichi Denshi Kogyo Kabushiki Kaisha. Electronic card receiving device and ejection mechanism. 4,931,622, Cl. 235-487.000.
Ohuchi, Masayuki; Oodaira, Hirosi; and Yoshida, Kenichi, to Kabushiki Kaisha Toshiba. IC card and method of manufacturing the same. 4,931,853, Cl. 357-74.000.
Oikawa, Hideaki: *See*—
Tamai, Shoji; Ohta, Masahiro; Kawashima, Saburo; Iiyama, Katsuaki; Oikawa, Hideaki; and Yamaguchi, Akihiro, 4,931,531, Cl. 528-172.000.
Oishi, Koji: *See*—
Horii, Yoshiyuki; and Oishi, Koji, 4,930,763, Cl. 271-31.000.
Oka, Masahiko: *See*—
Kawachi, Shoji; Tomoda, Masayasu; Oka, Masahiko; Furukawa, Yasuyoshi; and Tanaka, Hiroyuki, 4,931,511, Cl. 525-326.300.
Okabayashi, Mitsumasa; and Ito, Narao, to Juki Corporation. Ink jet printing apparatus with preprinting jet purging mechanism. 4,931,955, Cl. 64-519.000.
Okabe, Minoru; and Kikuchi, Akira, to Olympus Optical Co., Ltd. Television camera for endoscopes. 4,930,861, Cl. 350-96.250.
Okada, Masuhiro: *See*—
Matsumura, Shunichi; Inata, Hiroo; Umetani, Hiroyuki; and Okada, Masuhiro, 4,931,512, Cl. 525-333.300.
Okada, Yoshio: *See*—
Ogihara, Masaki; Okada, Yoshio; and Fujii, Syuso, 4,931,992, Cl. 365-189.110.
Okamoto, Ichiro: *See*—
Okamoto, Yoshio; Hatada, Koichi; Shibata, Tohru; Namikoshi, Hajime; and Okamoto, Ichiro, 4,931,184, Cl. 210-635.000.
Okamoto, Kazuo: *See*—
Hayakawa, Hiroshi; Maenishi, Hiroaki; and Okamoto, Kazuo, 4,930,213, Cl. 29-793.000.
Okamoto, Shinji; Minakawa, Masaaki; Neki, Youiti; and Nakagire, Masasi, to Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha. Hydrolyzed ethylene-vinyl acetate copolymer. 4,931,500, Cl. 525-60.000.
Okamoto, Tsuneo; and Sakaguchi, Yasuo, to Kureha Kagaku Kogyo Kabushiki Kaisha. Fluidized-bed reaction apparatus and a fludizing bed reaction process using the same. 4,931,259, Cl. 422-143.000.
Okamoto, Yoshio; Hatada, Koichi; Shibata, Tohru; Namikoshi, Hajime; and Okamoto, Ichiro, to Daicel Chemical Industries, Ltd. Optical resolution with tribenzoyl-b-1,4-chitosan. 4,931,184, Cl. 210-635.000.
Okamura, Masatoshi: *See*—
Hashizume, Kenji; Okamura, Masatoshi; and Shiba, Haruo, 4,930,714, Cl. 242-71.800.
Okano, Kunio: *See*—
Shimamura, Morihiko; Kamono, Shinobu; Okuyama, Junichi; Okano, Kunio; and Komine, Naoki, 4,930,607, Cl. 192-1.330.
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Wilkinson, Kerry E.; and DuVall, Larry A., 4,930,842, Cl. 297-466.000.

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Hatkevitz, Zvi; Maylor, Ken; and Jacques, Roland, 4,931,134, Cl. 156-630.000.

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Montgomery, Curtis J.; Patel, Chimanbhai P.; and Shetty, Jayarama K., 4,931,397, Cl. 435-243.000.

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Yatka, Robert J.; Patel, Mansukh M.; and Reed, Michael A., 4,931,294, Cl. 426-3.000.

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Ravindra, H.; Patil, Suhas S.; Lin, Ernest S.; Asaar, Mahmud M.; and Reddy, Dayakar, 4,931,946, Cl. 364-490.000.

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Raspor, Otto C.; and Pawloski, James C., 4,931,121, Cl. 156-213.000.

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Horn, Alan S.; Jerabek, Paul A.; and Peck, James V., 4,931,270, Cl. 424-1.100.

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Blume, Ingo; Peinemann, Klaus-Viktor; Pinnau, Ingo; and Wijmans, Johannes G., 4,931,181, Cl. 210-500.270.

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Hamm, Robert N.; Hunter, Scott R.; Hurst, George S.; Turner, James E.; and Wright, Harvel A., 4,931,653, Cl. 250-385.100.

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Kobos, Robert K.; and Pelosi, Lorenzo F., 4,931,172, Cl. 204-418.000.

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Park, Kyung T., 4,931,019, Cl. 434-409.000.

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Lambert, Claude; Pepin, Regis; and Latorse, Marie-Pascale, 4,931,456, Cl. 514-318.000.

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Voronin, Alexandr V.; Kuznetsov, Vladimir M.; Peregud, Boris P.; and Ruskov, Alexandr I., 4,931,702, Cl. 315-344.000.

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Biagiotti, Guglielmo, 4,931,130, Cl. 156-446.000.

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Monson, Clifford L.; Perry, Danny C.; Domay, Theodor; and Wilks, Henry A., 4,930,178, Cl. 15-320.000.

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Winkle, Sigvard; and Persson, Henrik, 4,930,542, Cl. 138-98.000.

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Elwing, Ben, 4,931,833, Cl. 355-85.000.

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Williams, Randall S.; Peterson, Michael D.; and Nentl, Robert J., 4,930,634, Cl. 206-454.000.

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Corradini, Paolo; De Rosa, Claudio; Guerra, Gaetano; Nicolais, Luigi; Petraccone, Vittorio; and Attalla, Giancarlo, 4,931,325, Cl. 428-35.700.

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Alfano, Robert R.; Petricevic, Vladimir; and Gayen, Swapan, 4,932,031, Cl. 372-41.000.

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Dhawan, Balram; Redmore, Derek; and Przybylinski, John L., 4,931,189, Cl. 210-700.000.

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Foster, George N.; Petty, Herbert E.; Blevins, Charles H., II; and King, Roswell E., III, 4,931,492, Cl. 524-188.000.

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Layton, Derek G.; Smith, Alan M.; Fisher, John H.; Pettigrew, Robert M.; and Petty-Saphon, Satham, 4,931,384, Cl. 435-7.000.

Peuckert, Marcellus: *See*—
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Auchter, Gerhard; Schwerzel, Thomas; Osterloh, Rolf; Neubert, Gerhard; Pfoehler, Peter; Druschke, Wolfgang; and Jaeger, Helmut, 4,931,494, Cl. 524-460.000.

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Kudert, Frederick G.; Latreille, Maurice G.; McHenry, Robert J.; Nahill, George F.; Pfutzenreuter, Henry, III; Tennant, William A.; Tung, Thomas T.; and Vella, John, Jr., 4,931,246, Cl. 264-241.000.

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Pfennings, Leonardus C. M. G.; Voss, Peter H.; O'Connell, Cormac M.; Phelan, Cathal G.; Davies, Thomas J.; and Ontrop, Hans, 4,931,667, Cl. 307-443.000.

Phelps, Weldon L.: *See*—
Boucher, Val G.; Phelps, Weldon L.; and Ekstrand, Daniel R., 4,930,366, Cl. 74-365.000.

Philip Morris Incorporated: *See*—
Fleenor, J. Jerome; Chance, Christopher N.; and Mitten, Robert T., 4,930,344, Cl. 73-49.300.
Philipps, Michael: *See*—
Eiberger, Berthold; Philipps, Michael; Schiffmann, Rolf; and Ries, Peter, 4,932,041, Cl. 375-120.000.
Philips Electronic and Associated Industries Ltd.: *See*—
Elliott, Charles T.; and Charlton, David E., 4,931,648, Cl. 250-370.100.
Phillippi, Max L.: *See*—
Berryman, Leslie N.; Horinek, Herbert J.; Phillippi, Max L.; Prucha, David A.; Reidenbach, Vincent G.; and Stephenson, Stanley V., 4,930,576, Cl. 166-308.000.
Phillips, Charlotte N. Deck board spacer and nailing guide. 4,930,225, Cl. 33-526.000.
Phillips, Christopher R., to Absorption Corp. Degradable absorbent material and manufacturing process therefor. 4,931,139, Cl. 162-100.000.
Phillips, Douglas B., Sr. Chamfering reamer with trip shoulder. 4,930,946, Cl. 408-80.000.
Phillips, Fred W.: *See*—
Goradia, Dhanvant H.; Phillips, Fred W.; and Schluge, Gregory, 4,932,036, Cl. 375-1.000.
Phillips, Kirk B.; and Kastan, Peter, to Moose Products, Inc. Method and apparatus for controlling the operation of a security system. 4,931,769, Cl. 340-541.000.
Phillips Petroleum Company: *See*—
Plotter, Douglas R., 4,931,171, Cl. 208-409.000.
Phillips Plastics Corporation: *See*—
Bart, Joseph; and Wollar, Burnell J., 4,930,279, Cl. 52-466.000.
Phillips, Roger W.: *See*—
Berning, Peter H.; and Phillips, Roger W., 4,930,866, Cl. 350-320.000.
Physiological Research Associates: *See*—
Barabino, William A.; and Cross, Robert J., 4,931,274, Cl. 424-70.000.
Picker International, Inc.: *See*—
Lindstrom, Walter W., 4,930,510, Cl. 128-654.000.
Pidgeon, Charles, to Purdue Research Foundation. Immobilized artificial membranes. 4,931,498, Cl. 525-54.100.
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Schwartz, Ulrich; Grosser, Rolf; Piejko, Karl-Erwin; Bomer, Bruno; and Arlt, Dieter, 4,931,525, Cl. 526-305.000.
Pieper, Helmut, to Sorg GmbH & Co. KG. Discontinuous glass melting furnace. 4,932,035, Cl. 373-32.000.
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Pilling Co.: *See*—
Pelta, Samuel, 4,930,856, Cl. 350-96.200.
Pinkhasov, Eduard, to Vapor Technologies Inc. High penetration deposition process and apparatus. 4,931,306, Cl. 427-37.000.
Pinkney, Harold F. L.: *See*—
Charlesworth, Arthur M.; and Pinkney, Harold F. L., 4,931,866, Cl. 358-93.000.
Pinnau, Ingo: *See*—
Blume, Ingo; Peinemann, Klaus-Viktor; Pinnau, Ingo; and Wijmans, Johannes G., 4,931,181, Cl. 210-500.270.
Pinnow, Douglas A., to Universal Photonix, Inc. Apparatus and method for a universal electronic locking system. 4,931,789, Cl. 340-825.560.
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Pioneer Electronic Corporation: *See*—
Bessho, Akira, 4,932,019, Cl. 369-247.000.
Hasegawa, Yoshinori; and Hirai, Kiyofumi, 4,931,796, Cl. 341-154.000.
Kakiuchi, Shizuo; and Iizuka, Hiroshi, 4,931,724, Cl. 324-103.00P.
Tanaka, Satoru, 4,930,849, Cl. 350-6.600.
Piorr, Robert: *See*—
Schenker, Gilbert; Piorr, Robert; and Luettge, Sabine, 4,931,218, Cl. 252-551.000.
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Robecchi, Edoardo, 4,931,030, Cl. 474-237.000.
Pisa, Gina: *See*—
LaRosa, Joseph P.; and Pisa, Gina, 4,930,922, Cl. 401-281.000.
Piselli, Fulvio L., to Industria Chimica Profarmaco S.p.A. Process for the optical resolution of a racemic acid. 4,931,587, Cl. 562-401.000.
Pitney Bowes Inc.: *See*—
DiGiulio, Peter C.; Bergman, Norman J.; and Salazar, Edilberto I., 4,931,712, Cl. 318-625.000.
Holbrook, Russell W.; Kulpa, Walter J.; and Morabito, James, 4,930,764, Cl. 271-119.000.
Tolmie, Robert J., Jr., 4,930,441, Cl. 118-669.000.
Pizzichemi, Anthony. Anchoring member for an outdoor container especially an outdoor mailbox. 4,930,271, Cl. 52-155.000.
PKL Verpackungssysteme GmbH: *See*—
Farber, Jurgen, 4,930,683, Cl. 229-125.090.
Placon Corporation: *See*—
Borst, Rodney D.; and Niesen, Scott M., 4,930,627, Cl. 206-45.230.
Plastican, Inc.: *See*—
Blanchette, Henry J., 4,930,656, Cl. 220-276.000.
Plasynski, Joseph E.: *See*—
Valko, Joseph T.; Plasynski, Joseph E.; and Miller, Robert D., 4,931,157, Cl. 204-181.700.
Plee, Steven L.; Hartman, Peter; Martin, Jay K.; Nolan, J. Paul; Remboski, Donald J., Jr.; and Ross, Richard R., to Barrack Technology Limited. Method of operating an engine. 4,930,478, Cl. 123-425.000.
Plotts, William B.: *See*—
Muncy, Donald G.; and Plotts, William B., 4,931,615, Cl. 219-121.670.
Poff, Charles R., Jr. Rimfire firearm receiver. 4,930,238, Cl. 42-16.000.
Poirier, Jean, to Hutchinson. Support element with movement limiter, in particular for motor vehicle engines. 4,930,758, Cl. 269-292.000.
Polefka, Thomas G.: *See*—
Gaffar, Abdul; Polefka, Thomas G.; Ferlauto, Robert J., Jr.; and Crisafulli, Rosemarie M., 4,931,273, Cl. 424-52.000.
Poling, Ronald W., to General Electric Company. Control device. 4,931,604, Cl. 200-406.000.
Polymeters Response International Limited: *See*—
Hutt, Peter R.; and Day, Stephen, 4,931,725, Cl. 324-142.000.
Polyplastics Co., Ltd.: *See*—
Yamamoto, Kaoru; Kitano, Toshiaki; and Sano, Hiroyuki, 4,931,535, Cl. 528-230.000.
Ponisch, Martin; Hafner, Josef; and Schonenberger, Rolf, to Veit Transpo GmbH. Suspension conveyor with resiliently deformable drag material. 4,930,425, Cl. 104-172.400.
Poole, Donald R.; and Wilson, Michael A., to Automotive Systems Laboratory, Inc. Azide gas generating composition for inflatable devices. 4,931,111, Cl. 149-35.000.
Popil, Roman E.: *See*—
Houston, Kevin C. D.; and Popil, Roman E., 4,931,657, Cl. 250-559.000.
Porat, Itzhak; Rosenberg, Jehuda; Netzer, Ehud; and Netzer, Yishai. Two axis rate gyroscope. 4,930,365, Cl. 74-5.60A.
Porges, Karl G., to United States of America, Energy. Flowmeter for gas-entrained solids flow. 4,930,356, Cl. 73-861.080.
Porte, Johannes J.: *See*—
Quenin, John A.; and Porte, Johannes J., 4,931,257, Cl. 422-100.000.
Portec, Inc.: *See*—
Brown, Robert D.; Hogsett, Russell J.; Compton, Richard A.; and Swisher, Thomas W., 4,930,621, Cl. 198-831.000.
Porteous, Don D. Combination working tray and sterilization case for medical instruments. 4,930,660, Cl. 220-367.000.
Porter, Eahmal L.; Wozniak, Walter E.; and Garner, Gerald D., to McDonnell Douglas Corporation. Confluent nozzle. 4,930,701, Cl. 239-102.200.
Potter, Arthur C.; and Eeles, Deborah J. M. Cutting board. 4,930,759, Cl. 269-54.500.
Poulsen, Harold W.: *See*—
Srinivasan, Kollengode V.; Herrington, Leo P.; Basaly, Mores A.; and Poulsen, Harold W., 4,931,151, Cl. 204-376.000.
Poulsen, Peder U. Method and apparatus for joining electrical wires. 4,931,611, Cl. 219-56.220.
Poupaert, Jacques: *See*—
Bru-Magniez, Nicole; De Cock, Christian; Poupaert, Jacques; De Keyser, Jean-Luc; and Dumont, Pierre, 4,931,584, Cl. 560-190.000.
PPG Industries, Inc.: *See*—
Haynes, Ronald L.; Hoelscher, Charles H.; and Lasch, Jonathan G., 4,931,220, Cl. 252-586.000.
Heller, Harry G., 4,931,221, Cl. 252-586.000.
Kuhn, John J., 4,931,075, Cl. 65-1.000.
Kwiatkowski, Patricia L.; and Kwak, Won S., 4,931,219, Cl. 252-586.000.
Valko, Joseph T.; Plasynski, Joseph E.; and Miller, Robert D., 4,931,157, Cl. 204-181.700.
Prasad, Ravi, to Union Carbide Corporation. Process and system for the production of dry, high purity nitrogen. 4,931,070, Cl. 55-16.000.
Pratt, Charles F.: *See*—
Boutni, Omar M.; Nelson, Linda H.; Patterson, Dwight J.; Pratt, Charles F.; and Savenije, Herman B., 4,931,503, Cl. 525-67.000.
Pratt, Norman F., to Allied-Signal Inc. Method and apparatus for measuring strain or fatigue. 4,931,729, Cl. 324-209.000.
Preat, Jean-Luc, to Solvay & Cie (Societe Anonyme). Process for the preparation of an expandable vinyl plastisol. 4,931,478, Cl. 521-73.000.
Precision General, Inc.: *See*—
Nimberger, Spencer M., 4,930,361, Cl. 73-864.620.
Prell, Hedwig: *See*—
Dany, Franz-Josef; Klassen, Horst; Adrian, Renate; Prell, Hedwig; and Kalteyer, Gerhard, 4,931,272, Cl. 424-49.000.
Preti, George: *See*—
Cutler, Winnifred B.; Preti, George; and Huggins, George R., 4,931,403, Cl. 436-65.000.
Pride Machine Inc.: *See*—
Weishalla, Gale, 4,930,330, Cl. 72-348.000.
Priefert Mfg. Co., Inc.: *See*—
Priefert, William D., 4,930,450, Cl. 119-103.000.
Priefert, William D., to Priefert Mfg. Co., Inc. Livestock handling device. 4,930,450, Cl. 119-103.000.
Priesnitz, Alfred, to Eberhard Bauer GmbH & Co. Centering system for rotary machine elements, particularly boring, milling, reaming tools and the like. 4,930,957, Cl. 409-234.000.

Priester, Ralph D., Jr.; Strojny, Edwin J.; and Stutts, Debra H., to Dow Chemical Company. Chain extenders for polyurethanes. 4,931,487, Cl. 521-163.000.

Prigent, Michel: *See*—
Blanchard, Gilbert; Garreau, Francois; Prigent, Michel; and Dozieres, Richard, 4,931,419, Cl. 502-304.000.

Prihoda, Peter J., to Compax Engineering & Development Ltd. Lay-up for laminated-veneer-lumber. 4,930,556, Cl. 144-347.000.

Pro-Catalyse: *See*—
Blanchard, Gilbert; Garreau, Francois; Prigent, Michel; and Dozieres, Richard, 4,931,419, Cl. 502-304.000.

Procter & Gamble Company, The: *See*—
Gibson, Michael S.; Hawkins, Larry N.; Peffly, Marjorie M.; Kenneally, Corey J.; and Corrigan, Patrick J., 4,931,552, Cl. 536-119.000.

Proengin S.A.: *See*—
Clausin, Pierre, 4,930,434, Cl. 114-106.000.

Propper, Wilhelm: *See*—
Fischer, Georg; and Propper, Wilhelm, 4,930,619, Cl. 198-803.200.

Prototyp-Werke GmbH Fabrik fur Prazisionswerkzeuge: *See*—
Giesler, Josef, 4,930,949, Cl. 408-222.000.

Provence, Marc, to Salomon S.A. Ski boot. 4,930,233, Cl. 36-117.000.

Prucha, David A.: *See*—
Berryman, Leslie N.; Horinek, Herbert J.; Phillippi, Max L.; Prucha, David A.; Reidenbach, Vincent G.; and Stephenson, Stanley V., 4,930,576, Cl. 166-308.000.

Prudhon, Francois, to Rhone-Poulenc Chimie de Base. Phase contactor/process for generating high temperature gaseous phase. 4,931,012, Cl. 431-9.000.

Pruett, Donald N., to Sierra Aerospace Technology, Inc. Ceramic cased capacitor. 4,931,899, Cl. 361-308.000.

Pruitt, J. Crayton. Stapling process and device for use on the mesenteries of the abdomen. 4,930,503, Cl. 227-178.000.

Przybylinski, John L.: *See*—
Dhawan, Balram; Redmore, Derek; and Przybylinski, John L., 4,931,189, Cl. 210-700.000.

Psaar, Hubertus; and Berneth, Horst, to Bayer Aktiengesellschaft. Bis(indolyl)ethylene compounds. 4,931,567, Cl. 548-455.000.

Public Health Research Institute of the City of New York, Inc.: *See*—
Recsei, Paul A., 4,931,390, Cl. 435-183.000.

Public Safety Equipment, Inc.: *See*—
Jincks, Danny C.; and Latta, Michael D., 4,931,768, Cl. 340-473.000.

Puchta, Rolf: *See*—
Wilsberg, Heinz-Manfred; Bosserhoff, Georg; Puchta, Rolf; and Bucheler, Herbert, 4,931,063, Cl. 8-137.000.

Pudel, Volker. Recipe collection for compiling menus. 4,930,813, Cl. 283-39.000.

Purcell, John R.: *See*—
Breneman, Bruce C.; Purcell, John R.; and Sarwinski, Raymond E., 4,931,759, Cl. 335-301.000.
Burnett, Sibley C.; Purcell, John R.; Creedon, William P.; and Joshi, Chandrashekhar H., 4,930,314, Cl. 60-517.000.

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Pidgeon, Charles, 4,931,498, Cl. 525-54.100.

Purello, Alfred C. Portable combination cooking grill. 4,930,491, Cl. 126-332.000.

Putman, Rob R.; and George, Kevin, to Sony Corporation. Mounting assembly for satellite transmitting antenna. 4,931,809, Cl. 343-882.000.

Pyi, Hwa-Sheng: *See*—
Asghar, Safdar M.; Pyi, Hwa-Sheng; and Dunnion, Dermot, 4,931,973, Cl. 364-724.160.

Pylon Manufacturing Corporation: *See*—
Longman, Rodney K., 4,930,180, Cl. 15-250.420.

Pyrofoam, Inc.: *See*—
Martenson, Alfred J.; and Johnson, William J., 4,931,211, Cl. 252-378.00R.

Quadrini, John A.: *See*—
Cirrito, Vincent; Koubek, Kevin J.; and Quadrini, John A., 4,931,905, Cl. 361-385.000.

Quantel Limited: *See*—
Stapleton, Alan L., 4,931,956, Cl. 364-521.000.

Quayle, Arthur; and Stead, Cecil V., to Imperial Chemical Industries PLC. Lithium salt of copper complex monoazo dye. 4,931,550, Cl. 534-724.000.

Quenin, John A.; and Porte, Johannes J., to Eastman Kodak Company. Positively engaged pipette and pipette support. 4,931,257, Cl. 422-100.000.

Quenzi, Philip J.; Somero, David W.; and Somero, Paul J., to Somero, David W. Screeding apparatus and method. 4,930,935, Cl. 404-75.000.

Quick, David C., to Sundstrand Corporation. Neutral position locking system for aircraft control surfaces. 4,930,730, Cl. 244-224.000.

Quiogue, Honesto D., to Hubbell Incorporated. Ballast and optical housings for grade mounted light fixture. 4,931,914, Cl. 362-265.000.

Quiogue, Honesto D., to Hubbell Incorporated. Sealing system for grade mounted light fixture. 4,931,915, Cl. 362-267.000.

Qureshi, Shahid P.; Gardner, Hugh C.; and Newman-Evans, Richard H., to Amoco Corporation. Damage tolerant fiber-reinforced composites based on cyanate ester/urea thermosetting composition. 4,931,496, Cl. 524-612.000.

Rabinovich, Leonid: *See*—
Barnett, Charles B.; and Rabinovich, Leonid, 4,930,578, Cl. 169-39.000.

Radian Corporation: *See*—
Bell, Ronald D., 4,930,305, Cl. 60-39.060.

Radio Flyer Inc.: *See*—
Valiga, Richard A.; and Hart, Richard S., 4,930,831, Cl. 296-26.000.

Radwanski, Fred R.; Trimble, Lloyd E.; Chambers, Leon E., Jr.; and Connor, Linda A. Nonwoven fibrous hydraulically entangled non-elastic coform material and method of formation thereof. 4,931,355, Cl. 428-283.000.

Rafalovich, Boris A.: *See*—
Chernyak, Zinovy A.; Tsvetkov, Alexandr A.; Onischenko, Alexandr M.; Kandala, Anatoly I.; Khrapov, Valery G.; Nunuparov, Georgy M.; Slavinsky, Vladimir M.; Geikhman, Isaak L.; Omelchenko, Nikolai P.; Rafalovich, Boris A.; Silaev, Viktor I.; and Zhdanov, Konstantin F., 4,931,638, Cl. 250-253.000.

Rai Radiotelevisione Italiana: *See*—
Salvadorini, Rolando, 4,931,855, Cl. 358-12.000.

Raj, David: *See*—
Miers, David R.; Raj, David; and Varshneya, Deepak, 4,930,862, Cl. 350-96.290.

Rakic, Pasko: *See*—
Williams, Robert W.; and Rakic, Pasko, 4,932,044, Cl. 377-10.000.

Ralph, George A.; and Holtzinger, Charles R. Elevator motor control. 4,932,069, Cl. 318-809.000.

Ramesham, Rajeshuni; Thakoor, Anilkumar P.; and Lambe, John J., to California Institute of Technology. Memory switches based on metal oxide thin films. 4,931,763, Cl. 338-22.0SD.

Ramirez, Jose E.; and Vishnupad, Mohan, to Imaginative Research Associates, Inc. Self-foaming oil compositions and process for making and using same. 4,931,204, Cl. 252-167.000.

Ramsauer, Dieter. Pivot lever bar closure. 4,930,325, Cl. 70-209.000.

Ramshaw, Colin, to Imperial Chemical Industries PLC. Electrochemical cell. 4,931,166, Cl. 204-212.000.

Ran Free: *See*—
Bills, Randolph L., 4,931,608, Cl. 219-10.55F.

Rando, Joseph F., to Spectra-Physics, Inc. Forming markings on a vial surface. 4,930,263, Cl. 51-165.710.

Raniot University Authority of Applied Research & Industrial Development Ltd.: *See*—
Fitzig, Simon; and Feder, David, 4,930,920, Cl. 401-176.000.

Rank Cintel Limited: *See*—
Easterbrook, James E., 4,931,784, Cl. 340-728.000.

Rantanen, Heikki O.: *See*—
Paakkinen, Ilmari; Nordenswan, Erik T.; and Rantanen, Heikki O., 4,930,346, Cl. 73-59.000.

Rasetti, Vittorio: *See*—
Buhlmayer, Peter; Rasetti, Vittorio; Fuhrer, Walter; Stanton, James L.; and Goschl, Richard, 4,931,591, Cl. 564-165.000.

Rasmussen, Jerald K.: *See*—
Heilmann, Steven M.; Krepski, Larry R.; Moren, Dean M.; Rasmussen, Jerald K.; and Smith, Howell K., II, 4,931,582, Cl. 560-172.000.

Raspor, Otto C.; and Pawloski, James C., to Dow Chemical Company, The. Process for forming a plastic article from a plurality of layers of thermoplastic material. 4,931,121, Cl. 156-213.000.

Rasshofer, Werner, to Bayer Aktiengesellschaft. Catalytic hydrolysis process for polyamines. 4,931,595, Cl. 564-393.000.

Rastutis, John F. Scraper for the friction seal of paint cans. 4,930,177, Cl. 15-105.000.

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Croitoriu, Natan; Dror, Jacob; Goldenberg, Ephraim; Mendelovic, David; and Israel, Ganot, 4,930,863, Cl. 350-96.320.

Rault, Jean-Christophe, to Etat Francais, Represente par le Ministre des Postes, Telecommunications et de l'Espace (Centre National d'Etude des Telecommunications) CNET. Digital computing device for a data transmission installation using code 2B 1Q or the like. 4,931,980, Cl. 364-750.500.

Ravindra, H.; Patil, Suhas S.; Lin, Ernest S.; Assar, Mahmud M.; and Reddy, Dayakar, to Cirrus Logic, Inc. Programmable tiles. 4,931,946, Cl. 364-490.000.

Rawstron, Philip J. M.; and D'Abrera, Francis, to Exxon Production Research Company. Offshore platform deck/jacket mating system and method. 4,930,938, Cl. 405-204.000.

Ray, Jefferson L.; and Cooper, Michael E., to Sterling Drug Inc. Ratchet connector for hypodermic syringe pistons. 4,931,043, Cl. 604-228.000.

Raychem Corporation: *See*—
Koppitsch, Heinrich; and Sparling, Francis, 4,931,741, Cl. 324-525.000.
Rosenzweig, Nachum, 4,931,116, Cl. 156-85.000.

Raymond, Marvin L.: *See*—
Lowe, H. Edward, Jr.; and Raymond, Marvin L., 4,930,443, Cl. 119-1.000.

Raytheon Company: *See*—
Rolt, Kenneth D., 4,932,008, Cl. 367-165.000.
Ward, Harold R., 4,931,800, Cl. 342-162.000.

RCA Licensing Corporation: *See*—
den Hollander, Willem, 4,931,870, Cl. 358-142.000.
Hale, John R., 4,931,691, Cl. 313-417.000.

Rebhan, Herbert J., to Domain, Inc. Milk fever prophylactic treatment and composition. 4,931,290, Cl. 424-692.000.

Recker, Hans-Gert: *See*—
Kersten, Siegfried; Jaeger, Karl-Friedrich; Koenig, Karl-Heinz; Mueller, Albrecht; Pawliczek, Josef B.; Recker, Hans-Gert; Rohr, Wolfgang; and Wigger, August, 4,931,466, Cl. 514-490.000.

Recomatic SA: *See*—
Rerat, Charles, 4,930,828, Cl. 294-82.150.

Recsei, Paul A., to Public Health Research Institute of the City of New York, Inc. Expression of the cloned lysostaphin gene. 4,931,390, Cl. 435-183.000.
Reddy, Dayakar: *See*—
Ravindra, H.; Patil, Suhas S.; Lin, Ernest S.; Asaar, Mahmud M.; and Reddy, Dayakar, 4,931,946, Cl. 364-490.000.
Redmore, Derek: *See*—
Dhawan, Balram; Redmore, Derek; and Przybylinski, John L., 4,931,189, Cl. 210-700.000.
Reed, Bradley E.: *See*—
Aidlin, Stephen H.; Reed, Bradley E.; and Strassner, John B., 4,930,327, Cl. 72-148.000.
Reed, Jay L. Electron beam gun. 4,931,700, Cl. 315-111.810.
Reed, Michael A.: *See*—
Yatka, Robert J.; Patel, Mansukh M.; and Reed, Michael A., 4,931,294, Cl. 426-3.000.
Rehm, Robert E.: *See*—
Gordon, Robert L.; Rehm, Robert E.; and Sosnowski, Robert, 4,930,682, Cl. 229-123.300.
Rehner, Helmut; Bartl, Knut; Stegmuller, Peter; Tischer, Wilhelm; and Rollinger, Sibylle, to Boehringer Mannheim GmbH. Process for stabilizing kinase. 4,931,392, Cl. 435-188.000.
Reichmann, Charles; and Kalsi, Bhupinder S., to DRI Mark Products, Inc. Cosmetic applicator. 4,930,923, Cl. 401-278.000.
Reidenbach, Vincent G.: *See*—
Berryman, Leslie N.; Horinek, Herbert J.; Phillippi, Max L.; Prucha, David A.; Reidenbach, Vincent G.; and Stephenson, Stanley V., 4,930,576, Cl. 166-308.000.
Reifel, Harry C.; Erdag, Eren; and Soerewyn, Herman V. D., to Unitrode Corporation. Hermetically sealed, surface mountable component and carrier for semiconductor devices. 4,931,906, Cl. 361-386.000.
Reinhardt, Bruce A., to United States of America, Air Force. Method of synthesis of thermoplastic aromatic benzoxazole polymers. 4,931,532, Cl. 528-185.000.
Reinholz, Erhard: *See*—
Friebe, Walter-Gunar; Reinholz, Erhard; Doerge, Liesel; and Stegmeier, Karlheinz, 4,931,462, Cl. 514-419.000.
Reinicke, Robert H.; and Yang, Jefferson Y. S., to Eaton Corporation. Fluid control device. 4,930,746, Cl. 251-129.110.
Reiniger, Siegfried: *See*—
Albrecht, Hans; Reiniger, Siegfried; Lauer, Wolfgang; Spies, Hans; Laucht, Horst; and Spies, Martin, 4,931,767, Cl. 340-425.500.
Reiser, Peter; and Kenner, Erich, to Eberspacher, J. Control and method for operating a vaporizer burner. 4,931,011, Cl. 431-3.000.
Reizlein, Karl: *See*—
Dobbers, Jurgen; Reizlein, Karl; and Bredtmann, Kurt, 4,931,099, Cl. 106-775.000.
Remboski, Donald J., Jr.: *See*—
Plee, Steven L.; Hartman, Peter; Martin, Jay K.; Nolan, J. Paul; Remboski, Donald J., Jr.; and Ross, Richard R., 4,930,478, Cl. 123-425.000.
Rencurosi, Fabien: *See*—
Groner, Alois; and Rencurosi, Fabien, 4,930,904, Cl. 383-45.000.
Renner, Brian K. Washing machine hose protector. 4,930,549, Cl. 137-312.000.
Renzo, Panontin, to Gregoris Photo Equipment S.p.A. Storing transfer apparatus to interconnect developing and printing machines for continuous strip photographic material. 4,930,672, Cl. 226-119.000.
Rerat, Charles, to Recomatic SA. Load-suspension arrangement for hoisting apparatus. 4,930,828, Cl. 294-82.150.
Restelli, Edward F., Jr.: *See*—
Cullo, Leonard A.; Nagle, Elliott V., Jr.; Restelli, Edward F., Jr.; and Yogan, Thomas J., 4,931,418, Cl. 502-218.000.
Restle, Serge: *See*—
Lang, Gerard; Maignan, Jean; Restle, Serge; and Shroot, Braham, 4,931,589, Cl. 562-490.000.
Rexham Corporation: *See*—
Ellison, Thomas M.; and Winton, Robert A., 4,931,324, Cl. 428-31.000.
Reynolds, Richard L., to Pac-Fasteners, an Affiliate of Peterson American Corp. Nut and stud assembly. 4,930,962, Cl. 411-366.000.
Rez, Ferenc: *See*—
Barlai, Zoltan; Dorcsi, Geza; Rez, Ferenc; and Vamos, Attila, 4,931,736, Cl. 324-367.000.
Rheinische Braunkohlenwerke AG: *See*—
Molerus, Otto O.; and Wirth, Karl-Ernst, 4,931,260, Cl. 422-147.000.
Wolfrum, Erhard; Faber, Wolfgang; Konig, Reiner; and Sieglen, Rolf A., 4,930,359, Cl. 73-863.230.
Rheinmetall GmbH: *See*—
Meffert, Wolfgang; Silligmann, Kalr-Heinz; Fischer, Siegmar; and Hahn, Ulf, 4,930,420, Cl. 102-374.000.
Rhodenizer, Harold: *See*—
Kukanskis, Peter E.; and Rhodenizer, Harold, 4,931,148, Cl. 204-15.000.
Rhodes, Joseph C., Jr.; Moore, Victor S.; Kraft, Wayne R.; and Barrs, John W., to International Business Machines Corporation. Microword generation mechanism utilizing a separate programmable logic array for first microwords. 4,931,989, Cl. 364-900.000.
Rhodes, Mark W.: *See*—
Murrill, William D.; and Rhodes, Mark W., 4,930,598, Cl. 182-63.000.
Rhone-Poulenc Agrochimie: *See*—
Lambert, Claude; Pepin, Regis; and Latorse, Marie-Pascale, 4,931,456, Cl. 514-318.000.
Rhone-Poulenc Basic Chemicals Co.: *See*—
Band, Elliot I., 4,931,097, Cl. 106-672.000.
Rhone-Poulenc Chimie de Base: *See*—
Prudhon, Francois, 4,931,012, Cl. 431-9.000.
Rhone-Poulenc Inc.: *See*—
Mihalich, Herman C., 4,931,426, Cl. 505-001.000.
Ribbing, Wilfried: *See*—
Jadamus, Hans; Ribbing, Wilfried; and Feinauer, Roland, 4,931,504, Cl. 525-68.000.
Ribbon Technology Corporation: *See*—
Hackman, Lloyd E.; Dickson, James; Dunlap, David L.; and Handshey, Mark E., 4,930,565, Cl. 164-463.000.
Riblet, Leslie A.: *See*—
Goldstein, Irwin; de Tejada, Inigo S.; and Riblet, Leslie A., 4,931,445, Cl. 514-252.000.
Rice, James A.: *See*—
Winbow, Graham A.; Chen, Sen-Tsuen; and Rice, James A., 4,932,003, Cl. 367-75.000.
Rich, Albert C. Solar water heating system. 4,930,492, Cl. 126-420.000.
Richards, Charles W., IV: *See*—
Waters, George W.; Burr, Charles R.; and Richards, Charles W., IV, 4,932,070, Cl. 455-10.000.
Richards, Peter J.: *See*—
Bedford, Gerald M.; and Richards, Peter J., 4,930,675, Cl. 228-112.000.
Richardson-Vicks Inc.: *See*—
Kelleher, William J.; and McClintock, William J., 4,931,473, Cl. 514-688.000.
Richter, Roy; Gay, Jackson G.; and Kromer, Robert P., to General Motors Corporation. Method of optimizing a vehicle assembly line build sequence. 4,931,944, Cl. 364-468.000.
Ricketts, Garland B.: *See*—
Matthews, Thomas R.; and Ricketts, Garland B., 4,930,824, Cl. 294-19.100.
Ricoh Company, Ltd.: *See*—
Nakamura, Shogo, 4,932,063, Cl. 389-94.000.
Ny, Yoshihide, 4,931,984, Cl. 364-900.000.
Shimada, Tomoyuki; Sasaki, Masaomi; and Hashimoto, Mitsuru, 4,931,350, Cl. 430-59.000.
Suzuki, Takumi; Uehara, Kiyohiro; and Takahashi, Hisao, 4,930,876, Cl. 350-336.000.
Takahashi, Masakatsu, 4,931,988, Cl. 364-900.000.
Tanzawa, Misao; and Endo, Shuichi, 4,931,840, Cl. 355-298.000.
Tomita, Masami; Kawabata, Toshiyasu; Nanya, Toshiki; and Murayama, Hisao, 4,931,374, Cl. 430-106.000.
Uemura, Hiroyuki; Suzuki, Akira; Shimada, Masaru; and Mochizuki, Hidehiro, 4,931,423, Cl. 503-227.000.
Riegel, Ullrich: *See*—
Engelhardt, Friedrich; and Riegel, Ullrich, 4,931,497, Cl. 525-42.000.
Rieken, Heiko: *See*—
Brindopke, Dieter; and Rieken, Heiko, 4,930,687, Cl. 222-475.100.
Rieple, Theodore R.: *See*—
Cotter, Terrence; Anderson, Theodore; Gansser, Robert; Kryk, Lewis R.; and Rieple, Theodore R., 4,931,202, Cl. 252-99.000.
Ries, Peter: *See*—
Eiberger, Berthold; Philipps, Michael; Schiffmann, Rolf; and Ries, Peter, 4,932,041, Cl. 375-120.000.
Riesner, Manfred: *See*—
Henschel, Walter; Riesner, Manfred; and Kunstmann, Uwe, 4,931,243, Cl. 264-109.000.
Rieth, Paul H.: *See*—
Neudeck, George W.; and Rieth, Paul H., 4,931,415, Cl. 501-133.000.
Rigby, William R., to Westvaco Corporation. Ovenable food container with removable lid. 4,930,639, Cl. 206-621.000.
Rijnstaal B.V.: *See*—
Dackus, Arnold J. G., 4,930,547, Cl. 138-171.000.
Rikagaku Kenkyusho: *See*—
Yoshioka, Hirosuke; Obata, Tokio; Fujii, Katsutoshi; Yoshiya, Haruo; Tsutsumiuchi, Kiyoshi; and Shikita, Shoji, 4,931,455, Cl. 514-256.000.
Rinehold, Elizabeth A., to McGhan Medical Corporation. Folding leaf valve and method of making. 4,930,535, Cl. 137-15.000.
Ring King Visibles: *See*—
Drake, Craig D.; and Ting, Phillip, 4,931,978, Cl. 364-708.000.
Ringo, Steven M.: *See*—
Kaplan, Robert H.; LaCava, Alberto; Shirley, Arthur I.; and Ringo, Steven M., 4,931,071, Cl. 55-25.000.
Rinschler, Craig R.: *See*—
Manniso, James L.; Lutz, John H.; and Rinschler, Craig R., 4,931,178, Cl. 210-228.000.
Risthaus, Josef: *See*—
Lemmer, Helmut; and Risthaus, Josef, 4,931,757, Cl. 335-131.000.
Ristuccia, John, Sr. Index card for index card file. 4,930,928, Cl. 402-79.000.
Rittaishashinzo Co., Ltd.: *See*—
Morioka, Kimihiko, 4,931,817, Cl. 354-113.000.
Ritter, John A.; Tomaka, Jan Z.; and Muda, Jozes A., to Thrall Car Manufacturing Company; and Alcan International Limited. Railroad gondola or hopper car, particularly a coal car. 4,930,427, Cl. 105-406.100.
Ritz, Josef: *See*—
Fuchs, Hugo; Agab, David; Neubauer, Gerald; and Ritz, Josef, 4,931,592, Cl. 564-267.000.
Rivera, David. Vehicle bumper. 4,930,823, Cl. 293-107.000.

Robbins, Edward S., III. Thin film container with removable lid and related process. 4,930,644, Cl. 215-1.00C.

Robecchi, Edoardo, to Pirelli Transmissioni Industriali S.p.A. Flexible belt and relative driving system. 4,931,030, Cl. 474-237.000.

Robert Bosch GmbH: *See*—
Amor, Hamed; and Luke, Hans-Dieter, 4,931,869, Cl. 358-133.000.
Kesel, Bruno; Zink, Gerhard; and Winter, Karin, 4,930,984, Cl. 416-203.000.
Mester, Roland; Loos, Rolf; Heitmann, Jurgen; and Muller, Jurgen, 4,931,885, Cl. 360-48.000.

Robert, Dominique: *See*—
Jung, Louis; and Robert, Dominique, 4,931,471, Cl. 514-622.000.

Robertson, David W.: *See*—
Holland, Donald R.; and Robertson, David W., 4,931,470, Cl. 514-619.000.

Robin Hood Multifoods, Inc.: *See*—
Malyniak, Nancy R.; and Meagher, James F., 4,931,297, Cl. 426-265.000.

Robinette, Richard T.: *See*—
Sporzynski, Robert S.; Evans, Anthony C.; and Robinette, Richard T., 4,930,606, Cl. 188-218.0XL.

Robins, Ian: *See*—
Sibbald, Alastair; Webb, Brian C.; Robins, Ian; Ross, John F.; and Bell, Edward C., 4,931,851, Cl. 357-25.000.

Robinson, Morris D., to Walsco Truck Equipment Co., Inc. Tiltable tailgate lift. 4,930,973, Cl. 414-557.000.

Robinson, Randall W. Animal toy. 4,930,448, Cl. 119-29.000.

Robinson, Richard P.; and Neilson, Joseph S., to Tandem Computers Incorporated. Electric module latch assembly. 4,931,907, Cl. 361-391.000.

Robinson, Roy: *See*—
Wheeler, Richard G.; and Robinson, Roy, 4,930,852, Cl. 350-96.100.

Robinson, Steven A.: *See*—
Chen, Yud-Ren; and Robinson, Steven A., 4,931,933, Cl. 364-409.000.

Roboflex Ltd.: *See*—
Heck, Siegfried, 4,930,355, Cl. 73-840.000.

Roccanova, Frank. Gem capture board game. 4,930,788, Cl. 273-248.000.

Roche, Pascal; and Muoy, Yin H., to Thomson-CSF. Method for the fabrication of a connection zone for a symmetrical strip line type microwave circuit and circuit obtained thereby. 4,930,215, Cl. 29-830.000.

Rochelle, Gary T.; and Jozewicz, Wojciech, to Board of Regents, The University of Texas System. Process for removing sulfur from sulfur-containing gases. 4,931,264, Cl. 423-242.000.

Rock, Edward T.: *See*—
Hassanzadeh, Reza; Funderburk, Donald G.; Schwartz, Steven A.; and Rock, Edward T., 4,931,740, Cl. 324-457.000.

Rockcor, Inc.: *See*—
McKevitt, Frank X., 4,930,310, Cl. 60-271.000.

Rockenfeller, Gottfried; and Rockenfeller, Uwe, to Rockenfeller KG. Driven tubular wall-plug anchoring element for light and porous concrete. 4,930,963, Cl. 411-44.000.

Rockenfeller KG: *See*—
Rockenfeller, Gottfried; and Rockenfeller, Uwe, 4,930,963, Cl. 411-44.000.

Rockenfeller, Uwe: *See*—
Rockenfeller, Gottfried; and Rockenfeller, Uwe, 4,930,963, Cl. 411-44.000.

Roda, Aldo: *See*—
Frigerio, Giuliano; Roda, Aldo; and Roda, Enrico, 4,931,038, Cl. 604-22.000.

Roda, Enrico: *See*—
Frigerio, Giuliano; Roda, Aldo; and Roda, Enrico, 4,931,038, Cl. 604-22.000.

Roh, Jae Y. Power free triple conveyor. 4,930,618, Cl. 198-781.000.

Rohm GmbH: *See*—
Knebel, Joachim; Kerscher, Volker; and Ude, Werner, 4,931,594, Cl. 568-727.000.

Rohr, Wolfgang: *See*—
Kersten, Siegfried; Jaeger, Karl-Friedrich; Koenig, Karl-Heinz; Mueller, Albrecht; Pawliczek, Josef B.; Recker, Hans-Gert; Rohr, Wolfgang; and Wigger, August, 4,931,466, Cl. 514-490.000.

Rolando, Richard J.: *See*—
Krueger, Dennis L.; Insley, Thomas I.; Meyer, Daniel E.; and Rolando, Richard J., 4,931,230, Cl. 264-6.000.

Rollinger, Sibylle: *See*—
Rehner, Helmut; Bartl, Knut; Stegmuller, Peter; Tischer, Wilhelm; and Rollinger, Sibylle, 4,931,392, Cl. 435-188.000.

Rollins, Thomas J.; Mooney, Charles W.; and Nguyen, Tuan K., to Motorola, Inc. Unitized housing for silent and tone pager alerting system. 4,931,765, Cl. 340-407.000.

Rolls-Royce plc: *See*—
Newton, Arnold C., 4,930,307, Cl. 60-226.100.
Savill, Anthony M., 4,930,729, Cl. 244-200.000.

Rolt, Kenneth D., to Raytheon Company. Hinge-modified flextensional transducer. 4,932,008, Cl. 367-165.000.

Romberger, John A.; Jones, Robert D.; and Carr, Richard P., to Nalco Chemical Company. Silica as blocking agent for fiberglass sizing. 4,931,318, Cl. 427-397.700.

Romine, Hugh E., to Conoco Inc. Process for producing clean distillate pitch and/or mesophase pitch for use in the production of carbon filters. 4,931,162, Cl. 208-41.000.

Roome, Albert T.: *See*—
Miyashiro, Stanley K.; Morris, Francis E.; and Roome, Albert T., 4,932,039, Cl. 375-102.000.

Root-Lowell Manufacturing Company: *See*—
Ellison, Garry L., 4,930,664, Cl. 222-1.000.
Ellison, Garry L., 4,930,686, Cl. 222-394.000.

Roquette Freres: *See*—
Leleu, Jean-Bernard, 4,931,101, Cl. 127-60.000.

Rosembaum, Georges: *See*—
Grollier, Jean-Francois; Cotteret, Jean; and Rosembaum, Georges, 4,931,066, Cl. 8-410.000.

Rosen, Henri E. Shoe fitting system. 4,931,773, Cl. 340-573.000.

Rosenberg, Jehuda: *See*—
Porat, Itzhak; Rosenberg, Jehuda; Netzer, Ehud; and Netzer, Yishai, 4,930,365, Cl. 74-5.60A.

Rosenzweig, Nachum, to Raychem Corporation. Heat-recoverable coupler. 4,931,116, Cl. 156-85.000.

Rosner, Peter: *See*—
Heidelberg, Gotz; Grundl, Andreas; and Rosner, Peter, 4,931,677, Cl. 310-12.000.

Ross, Dennis L.: *See*—
Katz, Ronald A.; and Ross, Dennis L., 4,932,046, Cl. 379-32.000.

Ross, John F.: *See*—
Sibbald, Alastair; Webb, Brian C.; Robins, Ian; Ross, John F.; and Bell, Edward C., 4,931,851, Cl. 357-25.000.

Ross Operating Valve Company: *See*—
Cameron, Russell J.; Krape, Richard P.; and Winsand, Robert N., 4,930,401, Cl. 91-32.000.

Ross, Richard R.: *See*—
Plee, Steven L.; Hartman, Peter; Martin, Jay K.; Nolan, J. Paul; Remboski, Donald J., Jr.; and Ross, Richard R., 4,930,478, Cl. 123-425.000.

Rossi, Albino: *See*—
Perren, Beat H.; and Rossi, Albino, 4,930,826, Cl. 294-68.270.

Rossman, Phillip J.; and Wiener, Scott A., to Lunar Radiation, Inc. Ultrasonic densitometer device and method. 4,930,511, Cl. 128-661.030.

Rothman, Ulf S. E.: *See*—
Ekman, Bo M.; Larsson, Kare V.; Lindahl, Ake R.; and Rothman, Ulf S. E., 4,931,284, Cl. 424-450.000.

Rotring-Werke Riepe KG: *See*—
Brenke, Matthias; and Koch, Detlef, 4,931,093, Cl. 106-19.000.

Rottinghaus, Robert B. Manual hose end crimper. 4,930,326, Cl. 72-35.000.

Rowe, Daniel G. Sacral brace. 4,930,499, Cl. 128-78.000.

Rowe, John A.: *See*—
Staresina, Stjepan; and Rowe, John A., 4,930,278, Cl. 52-315.000.

Rowse, Jack H.: *See*—
Thompson, Craig E.; and Rowse, Jack H., 4,930,725, Cl. 244-53.00R.

Rowson, Stuart C.: *See*—
Daniel, Richard A.; Rowson, Stuart C.; Barnhart, James E.; and Paek, Woonsuk, 4,931,986, Cl. 364-900.000.

Roy, Donald W.; and Hastert, James L., to Coors Porcelain Company. Dome and window for missiles and launch tubes with high ultraviolet transmittance. 4,930,731, Cl. 244-316.000.

Roychoudhuri, Chandrasekhar: *See*—
Clark, George L.; Heflinger, Lee O.; Roychoudhuri, Chandrasekhar; Brooks, Robert E.; and Sharma, Madan M., 4,930,855, Cl. 350-96.190.

Royo, Paris E.: *See*—
Tichenor, Clyde L.; Royo, Paris E.; and Fleming, Alex W., 4,930,884, Cl. 350-624.000.

Roznowski, Michael D.: *See*—
Kucera, Clare H.; Crema, Stefano C.; Roznowski, Michael D.; Konrad, Gerd; and Hartmann, Heinrich, 4,931,489, Cl. 523-130.000.

Rubbelke, David L.: *See*—
Bandhopadhyay, Deb K.; Greenlees, Thomas A.; and Rubbelke, David L., 4,930,348, Cl. 73-472.000.

Rudick, Arthur G., to Coca-Cola Company, The. Microgravity dispenser with agitator, metering device and cup filler. 4,930,555, Cl. 141-98.000.

Rudick, Arthur G., to Coca-Cola Company, The. Juice dispensing system for a refrigerator door. 4,930,666, Cl. 222-181.000.

Rudolf, Klaus: *See*—
Engel, Wolfhard; Trummlitz, Gunter; Eberlein, Wolfgang; Mihm, Gerhard; Mayer, Norbert; De Jonge, Adriaan; and Rudolf, Klaus, 4,931,436, Cl. 514-220.000.

Rudolf, Rowland C., III: *See*—
Salsgiver, James A.; Bartel, Eugene W.; and Rudolf, Rowland C., III, 4,931,613, Cl. 219-68.000.

Rule Industries, Inc.: *See*—
LeBlanc, Kenneth, 4,930,224, Cl. 33-355.00D.

Rump, Hanns: *See*—
Holter, Heinz; and Rump, Hanns, 4,930,407, Cl. 98-2.010.

Ruppert, Gunther: *See*—
Koch, Werner; and Ruppert, Gunther, 4,931,064, Cl. 8-149.100.

Rusakov, Alexandr I.: *See*—
Voronin, Alexandr V.; Kuznetsov, Vladimir M.; Peregud, Boris P.; and Rusakov, Alexandr I., 4,931,702, Cl. 315-344.000.

Ruscio, Dominic V.: *See*—
Bawa, Rajan; and Ruscio, Dominic V., 4,931,279, Cl. 424-427.000.

Russel, Steven M.; McGlen, James A.; and Anderson, Erik V., to Eastman Kodak Company. Sheet collection mechanism for stacking long and short sheets. 4,930,765, Cl. 271-214.000.

Russell, Thomas L., Jr.: *See*—
Baral, Elliott; Brown, Percy B.; Hauptman, Reuben D.; Jaeger, Richard J., Jr.; LaPorta, Frank C.; Lauber, Pamela J.; LeCrosnier, Richard E.; Nelson, Randall H.; Russell, Thomas L., Jr.; and Ying, Wen-Ping, 4,932,042, Cl. 379-67.000.

Russo, Randolph J.: *See*—
Brooks, Lynwood C.; Fuller, Lloyd J.; Russo, Randolph J.; and Russo, Robert P., 4,930,642, Cl. 211-71.000.

Russo, Robert P.: *See*—
Brooks, Lynwood C.; Fuller, Lloyd J.; Russo, Randolph J.; and Russo, Robert P., 4,930,642, Cl. 211-71.000.

Rutschle, Eugen: *See*—
Winkler, Hans-Henning; and Rutschle, Eugen, 4,930,208, Cl. 29-568.000.

Rutty, John G.: *See*—
Arndt, Alfred; and Rutty, John G., 4,932,071, Cl. 455-58.000.

Ryham, Rolf, to Ahlstromforetagen Svenska AB. Apparatus and process for generating steam from wet fuel. 4,930,429, Cl. 110-229.000.

Ryuno, Koitchiro: *See*—
Enomoto, Kanehiko; Ryuno, Koitchiro; and Shimizu, Hitoshi, 4,931,391, Cl. 435-188.000.

Rzadki, Hans-Jurgen: *See*—
Ahrens, Norbert; Kluger, Wolfgang; Mihatsch, Joachim-Rudolf; and Rzadki, Hans-Jurgen, 4,930,943, Cl. 406-90.000.

Sabater, Jacques; and Gillet, Gerard, to Centre Tech. de L'Industie des Papiers cartons etc. Device for calibrating an apparatus for measuring the formation index of a sheet of paper. 4,931,659, Cl. 250-571.000.

Sabatka, Winston E., to Finishing Equipment, Inc. Method and apparatus for depositing an inorganic phosphate coating. 4,931,109, Cl. 148-249.000.

Sackmann, Gunter; Konig, Joachim; and Baumgen, Heinz, to Bayer Aktiengesellschaft. Polymers from ethylenic monomers. 4,931,510, Cl. 525-302.000.

Sadler, Alan A.: *See*—
Tansey, John A.; Davey, Rodney J.; and Sadler, Alan A., 4,930,860, Cl. 350-96.230.

Safi, Bechara F., to La Societe de Recherche Snc Inc. Bioreactor. 4,931,401, Cl. 435-287.000.

Sahagian, Edward H. Insert for pneumatic wheel. 4,930,558, Cl. 152-339.100.

Saijo, Takao: *See*—
Fujita, Masafumi; Saijo, Takao; and Tezuka, Kazuhiko, 4,931,828, Cl. 355-45.000.

Saika, Toshihiro: *See*—
Fukaya, Masaki; Kawakami, Soichiro; Itabashi, Satoshi; Terada, Katsunori; Gofuku, Ibachiro; Nakagawa, Katsumi; Hatanaka, Katsunori; Isobe, Yoshinori; Saika, Toshihiro; Kaneko, Tetsuya; Kitahara, Nobuko; and Suzuki, Hideyuki, 4,931,661, Cl. 250-578.100.

Saiki, Syuji; Sato, Kazue; and Honda, Kazuki, to Matsushita Electric Industrial Co., Ltd. Loudspeaker system. 4,930,596, Cl. 181-152.000.

Saint-Leger, Didier; and Bague, Arlette, to L'Oreal. Drug composition for treating or preventing acne by oral administration. 4,931,467, Cl. 514-529.000.

Saito, Jun: *See*—
Naito, Masataka; Honjo, Takeshi; Kobayashi, Kenji; Saito, Jun; Shido, Hironori; and Hiroi, Masakazu, 4,930,761, Cl. 270-53.000.

Saito, Masao: *See*—
Tsukada, Teruhisa; Saito, Masao; Fuse, Masao; and Sakon, Nobuharu, 4,930,811, Cl. 280-834.000.

Saito, Mikio: *See*—
Fushiya, Fusao; Yamazaki, Takashi; and Saito, Mikio, 4,930,583, Cl. 173-109.000.

Saito, Osamu; Iwano, Kazuko; and Ikeda, Yasushi, to Soft Energy Co., Ltd. Single-legged chair. 4,930,839, Cl. 297-338.000.

Saito, Takayoshi: *See*—
Arai, Tatsuo; Saito, Takayoshi; Tsujimura, Osamu; and Hayashizaki, Hiroaki, 4,930,945, Cl. 407-40.000.

Saito, Yoshihisa: *See*—
Kamiya, Takashi; Saito, Yoshihisa; Teraji, Tsutomu; Nakaguit, Osamu; Oku, Teruo; Nakamura, Hitoshi; and Hashimoto, Masashi, 4,931,555, Cl. 540-222.000.

Saitoh, Keishi: *See*—
Iida, Shigehira; Arai, Takayoshi; Hashizume, Junichiro; Takei, Tetsuya; and Saitoh, Keishi, 4,930,442, Cl. 118-723.000.

Saji, Mikio: *See*—
Hoshino, Akira; Saji, Mikio; and Fujii, Shigeaki, 4,931,360, Cl. 428-328.000.

Sakagami, Teruo: *See*—
Watanabe, Nobuhiro; and Sakagami, Teruo, 4,931,523, Cl. 526-292.300.

Sakaguchi, Yasuo: *See*—
Okamoto, Tsuneo; and Sakaguchi, Yasuo, 4,931,259, Cl. 422-143.000.

Sakaguchi, Yuriko: *See*—
Takakura, Makoto; Hori, Takahiro; Sakaguchi, Yuriko; and Nakamura, Yuji, 4,931,314, Cl. 427-140.000.

Sakai, Eiichi: *See*—
Takei, Yoshiaki; and Sakai, Eiichi, 4,931,372, Cl. 430-66.000.

Sakai, Hiroyoshi: *See*—
Takasugi, Hisashi; Kuno, Atsushi; Sakai, Hiroyoshi; Sugiyama, Yoshie; and Takaya, Takao, 4,931,453, Cl. 514-252.000.

Sakai, Masato; Umeda, Itsuki; Takeuchi, Yasuo; and Takemura, Yasuhiko, to Japan Synthetic Rubber Co., Ltd. Rubber composition derived from fluoroelastomer and ethylene-alpha-olefin copolymer rubber and rubber article formed therefrom. 4,931,499, Cl. 525-194.000.

Sakamoto, Masaki: *See*—
Mori, Sanae; Sakamoto, Masaki; Wada, Takuo; Mizuno, Yoshikazu; and Sato, Masakazu, 4,930,910, Cl. 384-276.000.

Sakamoto, Nobuyoshi; and Huor, Ou H., to Oki Electric Industry Co., Ltd. Surface-acoustic-wave device with a capacitance coupled between input and output. 4,931,755, Cl. 333-193.000.

Sakamoto, Noriaki: *See*—
Kojima, Kunio; Sakamoto, Noriaki; Deguchi, Toshihisa; and Yamane, Daiji, 4,932,013, Cl. 369-32.000.

Sakata, Kei: *See*—
Tosaka, Akio; Sakata, Kei; Hashiguchi, Koichi; Higashino, Tateo; and Ichida, Toshio, 4,931,106, Cl. 148-12.00C.

Sakon, Nobuharu: *See*—
Tsukada, Teruhisa; Saito, Masao; Fuse, Masao; and Sakon, Nobuharu, 4,930,811, Cl. 280-834.000.

Sakuma, Tomonori: *See*—
Itoh, Susumu; Satoh, Kazuo; and Sakuma, Tomonori, 4,930,260, Cl. 51-103.0TF.

Sakurada, Nobuaki: *See*—
Kawamura, Hideaki; Sakurada, Nobuaki; and Sasaki, Takashi, 4,931,864, Cl. 358-80.000.

Sakurai, Hidenori: *See*—
Takase, Hiroshi; Goto, Hisashi; Inoue, Takashi; Sakurai, Hidenori; and Kimura, Akiteru, 4,930,881, Cl. 350-445.000.

Sakurai, Tadashi: *See*—
Yoshida, Yasuo; Kakinuma, Tadashi; Sakurai, Tadashi; Kishima, Yoshio; and Kimugasa, Hirofumi, 4,931,655, Cl. 250-492.100.

Sakurai, Tomohisa: *See*—
Takehana, Sakae; Ueda, Yasuhiro; Gotanda, Masakazu; Sakurai, Tomohisa; and Adachi, Hideyuki, 4,930,494, Cl. 128-4.000.

Salazar, Edilberto I.: *See*—
DiGiulio, Peter C.; Bergman, Norman J.; and Salazar, Edilberto I., 4,931,712, Cl. 318-625.000.

Saleh, Ramzi Y.; and Wachs, Israel E., to Exxon Chemical Patents Inc. Aromatic carboxylic anhydride catalyst. 4,931,572, Cl. 549-239.000.

Sallis, Daniel V. Multi-lever rim-drive heliostat. 4,930,493, Cl. 126-438.000.

Salloum, Jan. Toilet lid safety restraint. 4,930,166, Cl. 4-253.000.

Salomon S.A.: *See*—
Provence, Marc, 4,930,233, Cl. 36-117.000.

Salsgiver, James A.; Bartel, Eugene W.; and Rudolf, Rowland C., III, to Allegheny Ludlum Corporation. Electrical discharge scribing for improving core loss of grain-oriented silicon steel. 4,931,613, Cl. 219-68.000.

Salvadorini, Rolando, to Rai Radiotelevisione Italiana. Method for generating and transmitting high-definition color television signals, compatible with current standards and process and apparatus for receiving said signals. 4,931,855, Cl. 358-12.000.

Salzman, Ronald H. Photovisual star diagonal. 4,930,883, Cl. 350-574.000.

Sampson, Craig F.; Sun, Rickson; Barsley, Paul N.; and Boyle, Dennis J., to Taurus Impressions, Inc. Flat-bed heated finger daisy wheel hot debossing stamper. 4,930,911, Cl. 400-28.000.

Sanbayashi, Takeshi: *See*—
Abuyama, Yasuo; Ide, Fumito; Hamanaka, Osamu; and Sanbayashi, Takeshi, 4,931,837, Cl. 355-245.000.

Sanden Corporation: *See*—
Akabane, Hidemitsu; Isobe, Toshimi; and Hoshino, Seiichi, 4,930,567, Cl. 165-25.000.
Kawano, Satoshi; Kimura, Yoshio; and Fukushima, Eiji, 4,930,955, Cl. 409-225.000.
Takahashi, Junichi, 4,930,321, Cl. 62-249.000.

Sandvik Special Metals Corp.: *See*—
Duerring, Anthony A., 4,930,328, Cl. 72-208.000.

Sangyoji, Kazuo: *See*—
Suzuki, Makoto; Mizuno, Shigeru; Sangyoji, Kazuo; and Takagi, Osamu, 4,931,825, Cl. 355-20.000.

Sanko Industries Limited: *See*—
Nakatsuji, Sanji, 4,930,384, Cl. 83-54.000.

Sankyo Company Limited: *See*—
Akabane, Yasuhiro; Tamura, Takamitsu; and Fujiwara, Masami, 4,931,562, Cl. 546-19.000.

Sano, Hiromichi: *See*—
Baba, Takeaki; Nanba, Keizo; Takeshima, Yoshio; Sano, Hiromichi; Tobita, Koji; Museto, Atsuo; Hara, Toshihiro; and Fujise, Kazuki, 4,931,340, Cl. 428-73.000.

Sano, Hiroyuki: *See*—
Yamamoto, Kaoru; Kitano, Toshiaki; and Sano, Hiroyuki, 4,931,535, Cl. 528-230.000.

Sano, Yoshio: *See*—
Iryo, Takeaki; Kubota, Satoshi; Sano, Yoshio; Murata, Yoshishige; and Koinuma, Yasumi, 4,930,879, Cl. 350-409.000.

Sano, Yuuji: *See*—
Yamada, Teruaki; Ukena, Toshiyasu; Akisue, Osamu; Kawai, Kenji; Sano, Yuuji; and Hayashida, Teruki, 4,931,107, Cl. 148-12.300.

Sanozky, Rosemary B.: *See*—
Klaenhammer, Todd R.; Sanozky, Rosemary B.; and Steenson, Larry R., 4,931,396, Cl. 435-252.300.

Sansevero, Frank M., to Otis Elevator Company. Curved escalator with fixed center constant radius path of travel. 4,930,622, Cl. 198-328.000.

Sanshin Kogyo Kabushiki Kaisha: *See*—
Nakahama, Ryoji; and Yamazaki, Toshiyuki, 4,931,027, Cl. 440-53.000.

Torigai, Katsumi; and Takahashi, Masanori, 4,931,025, Cl. 440-1.000.
Santel, Hans-Joachim: *See*—
Findeisen, Kurt; Lindig, Markus; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 4,931,084, Cl. 71-92.000.
Sanyo Chemical Industries, Ltd.: *See*—
Matsuoka, Masahiro; Akimoto, Keiichi; Sumita, Takeshi; Tomosada, Tsuyoshi; and Ishikawa, Isao, 4,931,483, Cl. 521-137.000.
Sanyo Electric Co., Ltd.: *See*—
Nagasawa, Naobumi; Houshi, Teruo; and Arai, Hiroyuki, 4,932,018, Cl. 369-59.000.
Saringer, John H., to Toronto Medical Corp. Apparatus for imparting continuous passive motion to a lower limb. 4,930,497, Cl. 128-25.00R.
Sartorius GmbH: *See*—
Kuhlmann, Otto; Sodler, Walter; and Stadler, Eberhard, 4,930,588, Cl. 177-212.000.
Sarwinski, Raymond E.: *See*—
Breneman, Bruce C.; Purcell, John R.; and Sarwinski, Raymond E., 4,931,759, Cl. 335-301.000.
Sasaki, Koushi: *See*—
Wada, Keisuke; Hara, Yoshinori; and Sasaki, Koushi, 4,931,573, Cl. 549-325.000.
Sasaki, Masaomi: *See*—
Shimada, Tomoyuki; Sasaki, Masaomi; and Hashimoto, Mitsuru, 4,931,350, Cl. 430-59.000.
Sasaki, Tadashi, to Seibu Oil Co., Ltd.; and Unique Chemical Consultant, Ltd. Method for lightening petroleum hydrocarbon oil by distillation. 4,931,170, Cl. 208-348.000.
Sasaki, Takashi: *See*—
Kawamura, Hideaki; Sakurada, Nobuaki; and Sasaki, Takashi, 4,931,864, Cl. 358-80.000.
Sasaki, Takeshi; Takakuwa, Yoshio; Haruna, Takayuki; and Yamada, Kiyoharu, to Daidotokushuko Kabushikikaisha. Method of repairing rolls of rolling mill and roll cutting apparatus. 4,930,380, Cl. 82-117.000.
Sasaki, Tohru: *See*—
Utsumi, Tohru; and Sasaki, Tohru, 4,931,925, Cl. 364-200.000.
Sasaki, Toshiaki: *See*—
Kashiwagi, Mayumi; Sasaki, Toshiaki; Mitsumura, Satoshi; and Kato, Masayoshi, 4,930,707, Cl. 241-5.000.
Sasatani, Tomohiko: *See*—
Nakayama, Tadayoshi; Sato, Chikara; Nagasawa, Kenichi; Sasatani, Tomohiko; Yoshimura, Katsuji; Takahashi, Koji; and Kozuki, Susumu, 4,932,066, Cl. 382-56.000.
Sato, Chikara: *See*—
Nakayama, Tadayoshi; Sato, Chikara; Nagasawa, Kenichi; Sasatani, Tomohiko; Yoshimura, Katsuji; Takahashi, Koji; and Kozuki, Susumu, 4,932,066, Cl. 382-56.000.
Sato, Hiroshi; and Shimizu, Eiichi, to Mitsubishi Jukogyo Kabushiki Kaisha. Mill roll stand. 4,930,713, Cl. 242-58.600.
Sato, Isamu: *See*—
Takeda, Hiroaki; Ishida, Masato; Abe, Eiichi; and Sato, Isamu, 4,931,882, Cl. 358-474.000.
Sato, Kazue: *See*—
Saiki, Syuji; Sato, Kazue; and Honda, Kazuki, 4,930,596, Cl. 181-152.000.
Sato, Kazuo; and Komori, Masahiro, to Dai-Ichi Kogyo Seiyaku Co., Ltd. Surface-treatment of synthetic or semi-synthetic fiber textile materials. 4,931,524, Cl. 527-301.000.
Sato, Masakazu: *See*—
Mori, Sanae; Sakamoto, Masaaki; Wada, Takuo; Mizuno, Yoshikazu; and Sato, Masakazu, 4,930,910, Cl. 384-276.000.
Sato, Minoru: *See*—
Takagi, Shiro; and Sato, Minoru, 4,931,957, Cl. 364-521.000.
Sato, Mitsuyoshi; Kaito, Takashi; and Nakagawa, Yoshitomo, to Seiko Instruments Inc. Mask-repairing device. 4,930,439, Cl. 118-723.000.
Sato, Tatsumi, to Shimadzu Corporation. Method and apparatus for scanning wavelength in spectrophotometers. 4,930,891, Cl. 356-326.000.
Sato, Toshio: *See*—
Motegi, Ryohei; Takeuchi, Shinichi; and Sato, Toshio, 4,930,358, Cl. 73-861.280.
Sato, Yasuji: *See*—
Nakayama, Yasunobu; and Sato, Yasuji, 4,932,043, Cl. 379-157.000.
Sato, Yukio; Wataya, Masafumi; Ishii, Hiroaki; and Udagawa, Yutaka, to Canon Kabushiki Kaisha. Multiple image forming apparatus. 4,931,815, Cl. 346-154.000.
Satoh, Kazuo: *See*—
Itoh, Susumu; Satoh, Kazuo; and Sakuma, Tomonori, 4,930,260, Cl. 51-103.0TF.
Satoh, Tetsuo: *See*—
Yamanashi, Teruaki; Ozawa, Hiroyuki; Yuasa, Hitoshi; Matsuno, Mitsuo; and Satoh, Tetsuo, 4,931,520, Cl. 526-281.000.
Satomi, Norio: *See*—
Watanabe, Kenji; Uyama, Tadao; Satomi, Norio; Nishikawa, Masahiro; Yamaguchi, Satorou; and Nakazawa, Ichiro, 4,931,251, Cl. 376-128.000.
Sauber, Charles J. Drain baffle grommet for vehicle compartments. 4,930,659, Cl. 220-367.000.
Sauber, Klaus: *See*—
Mauz, Otto; Noetzel, Siegfried; and Sauber, Klaus, 4,931,476, Cl. 521-34.000.
Saunders-Roe Developments Limited: *See*—
Wills, Kenneth F., 4,931,910, Cl. 362-34.000.
Savenije, Herman B.: *See*—
Boutni, Omar M.; Nelson, Linda H.; Patterson, Dwight J.; Pratt, Charles F.; and Savenije, Herman B., 4,931,503, Cl. 525-67.000.
Savill, Anthony M., to Rolls-Royce plc. Control of fluid flow. 4,930,729, Cl. 244-200.000.
Savin, Ronald R. Coating composition exhibiting improved resistance to environmental attack. 4,931,491, Cl. 523-443.000.
Sawada, Tatsumi: *See*—
Aihara, Yasuyuki; Baba, Shigeki; Akiyama, Eitetsu; and Sawada, Tatsumi, 4,930,460, Cl. 723-41.490.
Sawayama, Minoru: *See*—
Akai, Setsukazu; and Sawayama, Minoru, 4,930,610, Cl. 192-7.000.
Saxton, Gregory J.; and Kaleta, Gary S., to Gunderson, Inc. Device for changing the effective width of a container well of a freight car. 4,930,426, Cl. 105-355.000.
Scalar Corporation: *See*—
Yamamoto, Masao, 4,930,851, Cl. 350-96.100.
Scarampi, Sebastiano. Apparatus and methods for monitoring television viewers. 4,931,865, Cl. 358-84.000.
Schaap, Herm, to Levrite Inc. Autobody door aligning tool. 4,930,337, Cl. 72-458.000.
Schad, Robert D.; and Brown, Paul P., to Husky Injection Molding Systems Ltd. Coinjection of hollow articles and preforms. 4,931,234, Cl. 264-40.100.
Schaefer, Dietmar: *See*—
Zsifkovits, Wilhelm; Gruning, Burghard; Kollmeier, Hans-Joachim; Schaefer, Dietmar; and Weitemeyer, Christian, 4,931,362, Cl. 428-402.220.
Schallner, Otto: *See*—
Jensen-Korte, Uta; Schallner, Otto; Stetter, Jorg; Becker, Benedikt; Behrenz, Wolfgang; Stendel, Wilhelm; and Andrews, Peter, 4,931,461, Cl. 514-404.000.
Scharf, Robert M.: *See*—
Brush, Robert W., Jr.; Scharf, Robert M.; Davie, Campbell; Lutsky, Arthur A.; and Siano, Frank S., 4,930,200, Cl. 29-25.420.
Scharfenberg, Gottfried: *See*—
Freisleben, Horst; Scharfenberg, Gottfried; Sepp, Gunther; Benedikter, Richard; and Schmaebele, Werner, 4,930,888, Cl. 356-152.000.
Scharrer, Carl J., to Texas Instruments Incorporated. Single-level multiplexer. 4,932,027, Cl. 370-112.000.
Schaudt Maschinenbau GmbH: *See*—
Belthle, Heinz, 4,930,265, Cl. 51-288.000.
Schenk, Donald E.; and Miller, Jon E., to General Motors Corporation. Torque converter and clutch control with piezoelectric devices. 4,930,608, Cl. 192-3.290.
Schenker, Gilbert; Piorr, Robert; and Luettge, Sabine, to Henkel Kommanditgesellschaft auf Aktien. Sulfated hydroxy mixed ethers, a process for their production, and their use. 4,931,218, Cl. 252-551.000.
Scherer, Michael; Latz, Rudolf; and Patz, Ulrich, to Leybold Aktiengesellschaft. Apparatus for coating a substrate with dielectrics. 4,931,169, Cl. 204-298.110.
Scherf, Timothy P.; Dix, Daniel J.; and Carson, Douglas W., to Thomas Industries Inc. Trapeze lighting fixture. 4,931,917, Cl. 362-371.000.
Schering Aktiengesellschaft: *See*—
Burba, Christian; and Mrotzek, Werner, 4,931,529, Cl. 528-94.000.
Striedieck, Walter, 4,931,072, Cl. 55-87.000.
Schiavi, Cesare. Perfected feeding devices for internal combustion engines. 4,930,456, Cl. 123-572.000.
Schiel, Christian: *See*—
Steiner, Karl; Mullner, Josef; Schiel, Christian; and Flamig, Hans, 4,931,142, Cl. 162-358.000.
Schienda, Gregory A.; and Mayfield, Mark L., to United Technologies Corporation. Elevator diagnostic monitoring apparatus. 4,930,604, Cl. 187-133.000.
Schiffmann, Rolf: *See*—
Eiberger, Berthold; Philipps, Michael; Schiffmann, Rolf; and Ries, Peter, 4,932,041, Cl. 375-120.000.
Schilling, Rolf: *See*—
Krimmel, Heinz; Muller-Sybrichs, Manfred; Schilling, Rolf; and Weller, Ulrich, 4,931,229, Cl. 264-3.300.
Schindler, Gerhard: *See*—
Becker, Rainer; Eckhardt, Heinz; Eggersdorfer, Manfred; Schindler, Gerhard; and Jansen, Klaas, 4,931,428, Cl. 512-25.000.
Schlieder, Matthias: *See*—
Forchheim, Hans; and Schlieder, Matthias, 4,930,402, Cl. 91-167.00R.
Schlueter, Francis E.; and McConnell, Kenneth C., to Deere & Company. Telescoping basket for a cotton harvester. 4,930,297, Cl. 56-16.600.
Schluge, Gregory: *See*—
Goradia, Dhanvant H.; Phillips, Fred W.; and Schluge, Gregory, 4,932,036, Cl. 375-1.000.
Schlumberger Technologies, Inc.: *See*—
Jeffrey, A. K.; Marsh, David J.; and Collins, Philip I., 4,931,723, Cl. 371-22.300.
Schmaling, David N.: *See*—
Byrnes, Francis E.; and Schmaling, David N., 4,930,983, Cl. 416-134.00A.
Schmidt, Eric, to Wallace Computer Services, Inc. Foldable I.D. card. 4,930,234, Cl. 40-1.500.
Schmidt, Eric, to Wallace Computer Services, Inc. Mailer with oversized insert and method of making. 4,931,035, Cl. 493-216.000.
Schmidt, George M. Holder for plastic grocery bags. 4,930,734, Cl. 248-97.000.

Schmidt, Gunther: *See*—
Muller, Erich R.; Schmidt, Gunther; and Hofmeister, Klaus, 4,931,117, Cl. 156-89.000.
Schmidt, Robert R.: *See*—
Findeisen, Kurt; Lindig, Markus; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 4,931,084, Cl. 71-92.000.
Schnaebele, Werner: *See*—
Freisleben, Horst; Scharfenberg, Gottfried; Sepp, Gunther; Benedikter, Richard; and Schnaebele, Werner, 4,930,888, Cl. 356-152.000.
Schneider, Bernard; and Chapet, Gerard, to Cebal. Process for the production of a container or tube fitted with a pump. 4,931,245, Cl. 264-161.000.
Schneider, Fernand: *See*—
Barbier, Pierre; Schneider, Fernand; and Widmer, Ulrich, 4,931,463, Cl. 514-422.000.
Schneider, John F.; and Schneider, Kurt A. Cement composition comprising sodium tripolyphosphate and process for forming shaped articles therefrom. 4,930,428, Cl. 106-640.000.
Schneider, Kurt A.: *See*—
Schneider, John F.; and Schneider, Kurt A., 4,930,428, Cl. 106-640.000.
Schneider, Michael L.: *See*—
Dalnekoff, Stanley; and Schneider, Michael L., 4,931,932, Cl. 364-407.000.
Schneider, Siegfried: *See*—
Baumgarte, Ulrich; Fikentscher, Rolf; Heimann, Sigismund; Mertens, Heinrich; Schneider, Siegfried; and Vescia, Michele, 4,931,065, Cl. 8-188.000.
Schneider, William J. Apparatus for locking a flywheel. 4,930,371, Cl. 74-527.000.
Schofield, Kenneth; Gallmeyer, William W.; and Zwiep, Theodore C., to Donnelly Corporation. Rearview mirror and accessory mount for vehicles. 4,930,742, Cl. 248-475.100.
Schonenberger, Rolf: *See*—
Ponisch, Martin; Hafner, Josef; and Schonenberger, Rolf, 4,930,425, Cl. 104-172.400.
Schoonheere, Marnix J.; Lippens, Christiaan A. C.; and Naaktgeboren, Adrianus, to Ford New Holland, Inc. Method of density control in rectangular balers to improve the bale tying operation. 4,930,410, Cl. 100-3.000.
Schreder, Felix: *See*—
Kicherer, Robert; and Schreder, Felix, 4,931,620, Cl. 219-463.000.
Schreiber, Dietmar: *See*—
Jager, Walter; and Schreiber, Dietmar, 4,930,574, Cl. 166-266.000.
Schreiber, William P., to Bose Corporation. Stereo electroacoustical transducing. 4,932,060, Cl. 381-24.000.
Schreiner, Jim G.: *See*—
Martin, Danny T.; and Schreiner, Jim G., 4,930,281, Cl. 52-514.000.
Schroeder, Michael J.: *See*—
Hovis, Edward E.; Johnson, Eric D.; and Schroeder, Michael J., 4,931,484, Cl. 521-143.000.
Schubert, Helmut: *See*—
Worrell, Wayne; Weppner, Werner; and Schubert, Helmut, 4,931,214, Cl. 252-520.000.
Schulte, Klaus: *See*—
Krippl, Kurt; Schulte, Klaus; Hoffmann, Erwin; and Wiedermann, Rolf, 4,931,480, Cl. 521-99.000.
Schurter, Robert M., to A. O. Smith Corporation. Method of forming composite tubular structure. 4,930,204, Cl. 29-419.200.
Schurter, Rolf; Kunz, Walter; and Nyfeler, Robert, to Ciba-Geigy Corporation. Process and a composition for immunizing plants against diseases. 4,931,581, Cl. 560-18.000.
Schwab, Kerstin. Body relief display device. 4,930,693, Cl. 223-66.000.
Schwarbische Huetten-Werke GmbH: *See*—
Weckherlen, Werner; Dellit, Hans-Joachim; and Gruene, Hans-Georg, 4,930,230, Cl. 34-168.000.
Schwartz, Henry L.: *See*—
Mack, Daniel R.; Sturtevant, Alfred H.; and Schwartz, Henry L., 4,931,256, Cl. 422-65.000.
Schwartz, Herbert, to Timex Corporation. Three hand movement for a timepiece with improved timesetting gear train. 4,932,011, Cl. 368-185.000.
Schwartz, Robert E.: *See*—
Fromtling, Robert A.; Giacobbe, Robert A.; Liesch, Jerrold M.; Del Val, Sagrario M.; Schwartz, Robert E.; and Wichmann, Carol F., 4,931,352, Cl. 435-71.300.
Schwartz, Steven A.: *See*—
Hassanzadeh, Reza; Funderburk, Donald G.; Schwartz, Steven A.; and Rock, Edward T., 4,931,740, Cl. 324-457.000.
Schwartz, Ulrich; Grosser, Rolf; Piejko, Karl-Erwin; Bomer, Bruno; and Arlt, Dieter, to Bayer Aktiengesellschaft. Optical active (meth)acrylamides and polymers thereof for racemate resolution. 4,931,525, Cl. 526-305.000.
Schwarz, Meyer; Klun, Jerome A.; and Snow, J.Wendell, to United States of America, Agriculture. Octadienyl acetate synergist for the grape root borer pheromone. 4,931,032, Cl. 514-546.000.
Schwend, Fred N.: *See*—
McNeill, Samuel J., 4,930,737, Cl. 296-37.120.
Schwerzel, Thomas: *See*—
Auchter, Gerhard; Schwerzel, Thomas; Osterloh, Rolf; Neubert, Gerhard; Pfoehler, Peter; Druschke, Wolfgang; and Jaeger, Helmut, 4,931,494, Cl. 524-460.000.
Schwyn, Bernhard; and Ueberegger, Heinrich, to KMK Karl Maegerle Lizenz AG. Installation for producing packaging containers. 4,931,006, Cl. 425-412.000.
Scientific Atlanta: *See*—
Waters, George W.; Burr, Charles R.; and Richards, Charles W., IV, 4,932,070, Cl. 455-10.000.
Scientific Design Company, Inc.: *See*—
Weinstein, Robert M., 4,931,571, Cl. 549-230.000.
SciMed Life Systems, Inc.: *See*—
Euteneuer, Charles L., 4,930,341, Cl. 73-37.000.
Scitex Corporation Ltd.: *See*—
Succari, Shmuel; Gilad, Shalev; Nagler, Michael; Beiber, Avigdor; and Berman, Dov, 4,931,637, Cl. 250-235.000.
Scott, Deborah B.: *See*—
Scott, Edward J.; and Scott, Deborah B., 4,931,014, Cl. 431-126.000.
Scott, Edward J.; and Scott, Deborah B. Beveled glass candle holder. 4,931,014, Cl. 431-126.000.
Scott, Robert H., to Lucas Industries Public Limited Company. Fuel pump. 4,930,998, Cl. 417-462.000.
Scranton, Robert A.: *See*—
Hegde, Suryanarayan G.; Scranton, Robert A.; and Yarmchuk, Edward J., 4,931,887, Cl. 360-75.000.
Scriba S.p.A.: *See*—
Giuseppe, Bianchi, 4,931,301, Cl. 426-505.000.
SDI Operating Partners, L.P.: *See*—
Coffenberry, Norman D., 4,930,459, Cl. 123-41.150.
Sea, Ho T. Door window assembly. 4,930,255, Cl. 49-63.000.
Seal Integrity Systems, Inc.: *See*—
McDaniel, P. K., 4,930,342, Cl. 73-49.300.
Search & Source, Incorporated: *See*—
Sherman, Robert E., 4,931,929, Cl. 364-401.000.
Sears, Ronald E.: *See*—
Cummings, Peter A.; and Sears, Ronald E., 4,930,274, Cl. 52-200.000.
Sechler, Lee: *See*—
Eckert, Robert L.; Atkins, Don C.; and Sechler, Lee, 4,930,632, Cl. 206-386.000.
Sedlmair, Gerhard, to Marker Deutschland GmbH. Toe piece for safety ski-binding. 4,930,802, Cl. 280-625.000.
Sehl, Douglas, to Ski-East Limited Partnership, The. Tow-line winding device. 4,930,719, Cl. 242-86.50A.
Seibu Oil Co., Ltd.: *See*—
Sasaki, Tadashi, 4,931,170, Cl. 208-348.000.
Seidler, Heribert. Device for compensating the recoil energy of small arms. 4,930,397, Cl. 89-14.300.
Seike, Nobuki: *See*—
Nakahashi, Sumio; Miyamae, Fumihiko; and Seike, Nobuki, 4,931,227, Cl. 264-1.900.
Seiko Epson Corp.: *See*—
Iryo, Takeaki; Kubota, Satoshi; Sano, Yoshio; Murata, Yoshishige; and Koinuma, Yasumi, 4,930,879, Cl. 350-409.000.
Yasuda, Hirofumi, 4,931,996, Cl. 365-189.090.
Seiko Instruments Inc.: *See*—
Sato, Mitsuyoshi; Kaito, Takashi; and Nakagawa, Yoshitomo, 4,930,439, Cl. 118-723.000.
Sugita, Toshio; Funamoto, Hiroyuki; Furuta, Kazuyoshi; and Koseki, Osamu, 4,931,307, Cl. 427-38.000.
Seimiya, Ryubun: *See*—
Demizu, Hiromi; Obu, Makoto; Yano, Hidetoshi; Seimiya, Ryubun; and Tarumi, Noriyoshi, 4,930,438, Cl. 118-651.000.
Sekino, Toshifumi: *See*—
Hasegawa, Masaru; Suda, Osamu; Kohno, Hisao; Sekino, Toshifumi; Umezaki, Tetsuhiro; and Tanaka, Norio, 4,931,349, Cl. 430-58.000.
Selby, Howard W., III, to Selsys Corporation. Electronic image display systems with improved cathode-ray tube construction. 4,931,786, Cl. 340-755.000.
Selsys Corporation: *See*—
Selby, Howard W., III, 4,931,786, Cl. 340-755.000.
Selwyn, Stephen: *See*—
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Hale, Cecil H.; and Sharifian, Hossein, 4,931,154, Cl. 204-59.00R.

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Kugimiya, Shuzo; Fukumochi, Yoji; Nakamura, Ichiko; Hirai, Tokuyuki; and Suzuki, Hitoshi, 4,931,936, Cl. 364-419.000.
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Nagata, Syoichi; and Ohashi, Kunio, 4,931,618, Cl. 219-216.000.
Nakanishi, Yasuhiro; Ikemoto, Yutaka; and Suzuki, Takashi, 4,930,222, Cl. 374-170.000.
Nakao, Motokazu; Tojo, Tomotarou; and Tanaka, Kenji, 4,931,862, Cl. 358-75.000.
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Montgomery, Curtis J.; Patel, Chimanbhai P.; and Shetty, Jayarama K., 4,931,397, Cl. 435-243.000.

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Okamoto, Yoshio; Hatada, Koichi; Shibata, Tohru; Namikoshi, Hajime; and Okamoto, Ichiro, 4,931,184, Cl. 210-635.000.

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Naito, Masataka; Honjo, Takeshi; Kobayashi, Kenji; Saito, Jun; Shido, Hironori; and Hiroi, Masakazu, 4,930,761, Cl. 270-53.000.

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Sugita, Shuichi; Nakagawa, Satoshi; and Shimada, Naoko, 4,931,383, Cl. 430-551.000.

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Sato, Tatsumi, 4,930,891, Cl. 356-326.000.

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Toda, Junichi, 4,930,722, Cl. 242-245.000.
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Sato, Hiroshi; and Shimizu, Eiichi, 4,930,713, Cl. 242-58.600.

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Enomoto, Kanehiko; Ryuno, Koitchiro; and Shimizu, Hitoshi, 4,931,391, Cl. 435-188.000.

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Tsukamoto, Katsuhiro; Shimizu, Masahiro; and Miyatake, Hiroshi, 4,931,897, Cl. 361-313.000.

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Amaya, Shinji; Iwanari, Yoshiyuki; Shinzo, Kinji; Kogawara, Toshiro; Yamazaki, Syuuichi; Shimizu, Seiichi; and Kuriyama, Kazuya, 4,931,370, Cl. 430-45.000.

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Taguchi, Kenichi; and Watanabe, Masataka, 4,931,945, Cl. 364-477.000.

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Kimura, Haruo; Nobuo, Minematsu; and Shin-ichi, Suto, 4,931,963, Cl. 364-551.010.

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Ishii, Kimio, 4,931,226, Cl. 261-41.500.

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Takei, Masahiro; and Shinbori, Kenichi, 4,931,878, Cl. 358-335.000.

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Yoshifumi, Murata; Teruhisa, Kaneda; Kazuo, Hara; Katsunori, Takamoto; Isao, Ohonishi; and Shinichi, Yokota, 4,931,538, Cl. 528-292.000.

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Toda, Haruhisa; Fujiwara, Kouhei; Hosogai, Setsuo; and Shioguchi, Kazumi, 4,931,602, Cl. 200-144.00R.

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Yonemasu, Hiro; Shirai, Kiyohide; and Kawamura, Ikunosuke, 4,931,854, Cl. 357-74.000.

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Takahashi, Fumitaka; Okazaki, Kunio; Shiraishi, Masaru; Takahashi, Masayuki; Obara, Kazufumi; Yorimoto, Koji; and Tanabe, Tohru, 4,930,349, Cl. 73-497.000.

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Sonta, Hiromi; and Shiratori, Toshikazu, 4,931,262, Cl. 423-220.000.

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Tanaka, Toyoaki; Ohira, Katuzi; Nakamura, Akira; Kamei, Ryosuke; and Hashimoto, Akihiro, 4,931,005, Cl. 425-83.100.
Yanagimoto, Shigeru; and Kondo, Ryoichi, 4,930,566, Cl. 164-475.000.

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Lang, Gerard; Maignan, Jean; Restle, Serge; and Shroot, Braham, 4,931,589, Cl. 562-490.000.

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Brush, Robert W., Jr.; Scharf, Robert M.; Davie, Campbell; Lutsky, Arthur A.; and Siano, Frank S., 4,930,200, Cl. 29-25.420.

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Wolfrum, Erhard; Faber, Wolfgang; Konig, Reiner; and Sieglen, Rolf A., 4,930,359, Cl. 73-863.230.

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Amtmann, Heribert, 4,931,643, Cl. 250-327.200.
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Gleixner, Ronald; and Heidenfelder, Anton, 4,931,683, Cl. 310-89.000.
Herberg, Helmut, 4,931,848, Cl. 357-23.400.
Knauer, Karl, 4,931,981, Cl. 364-784.000.
Pausch, Thomas; and Willer, Josef, 4,931,136, Cl. 156-643.000.
Zitta, Heinz, 4,931,718, Cl. 323-313.000.

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Wakeman, Russell J.; and Shea, Stephen F., 4,930,465, Cl. 123-90.120.

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Brackett, Stephen E., 4,930,990, Cl. 416-223.00R.

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Pruett, Donald N., 4,931,899, Cl. 361-308.000.

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Smith, Gary W., 4,931,150, Cl. 204-26.000.

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Hshieh, Fwu-Iuan, 4,931,408, Cl. 437-44.000.

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Mercier, Regis; and Sillion, Bernard, 4,931,541, Cl. 528-370.000.

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Khanna, Jai K.; Silvey, Norman G.; and Williams, Charles D., 4,930,978, Cl. 415-58.300.

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Doherty, Roger D.; Singh, Rishi P.; and Slaney, John S., 4,931,255, Cl. 420-586.000.

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Fogarasi, Gabor; Sivo, Imre; Zacsek, Gabor; and Zakarias, Istvan, 4,931,004, Cl. 425-28.100.

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Jang, Hyo Keun, 4,930,821, Cl. 292-228.000.

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Wieczorek, Stefan, 4,931,705, Cl. 318-49.000.

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Sehl, Douglas, 4,930,719, Cl. 242-86.50A.

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Dimitrijevic, Peter; Skidmore, Mark; and Fishkin, Theodore S., 4,932,075, Cl. 455-226.000.

Skinner, George W.: *See—*
Johnson, Joseph L.; and Skinner, George W., 4,931,286, Cl. 424-480.000.

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Jadatz, Harald B., 4,930,960, Cl. 411-188.000.

Slavinsky, Vladimir M.: *See—*
Chernyak, Zinovy A.; Tsvetkov, Alexandr A.; Onischenko, Alexandr M.; Kandala, Anatoly I.; Khrapov, Valery G.; Nunuparov, Georgy M.; Slavinsky, Vladimir M.; Geikhman, Isaak L.; Omelchenko, Nikolai P.; Rafalovich, Boris A.; Silaev, Viktor I.; and Zhdanov, Konstantin F., 4,931,638, Cl. 250-253.000.

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Kroon, Peter; Deprettere, Edmond F. A.; and Sluyter, Robert J., 4,932,061, Cl. 381-30.000.

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Sharp, Douglas J.; and Smith, E. W., 4,930,819, Cl. 292-42.000.
Smith, Flint: *See*—
Halenbeck, Robert; Smith, Flint; and Kunitani, Michael, 4,931,543, Cl. 530-351.000.
Smith, Gary W., to SIFCO Industries, Inc. Selective electroplating apparatus and method of using same. 4,931,150, Cl. 204-26.000.
Smith, Gary W.: *See*—
Slutz, David E.; Gigl, Paul D.; Flood, Gary M.; and Smith, Gary W., 4,931,363, Cl. 428-408.000.
Smith, Gerald L.: *See*—
Lee, Robert H.; Levran, Alexander; Mak, Chi; Smith, Gerald L.; and Marcinkowski, Jacek J., 4,931,715, Cl. 318-709.000.
Smith, Howell K., II: *See*—
Heilmann, Steven M.; Krepski, Larry R.; Moren, Dean M.; Rasmussen, Jerald K.; and Smith, Howell K., II, 4,931,582, Cl. 560-172.000.
Smith, Robert S. Stiff air bearing for large radial load. 4,930,907, Cl. 384-118.000.
Smith, Troy F.: *See*—
Beeman, John A.; Leep, James L.; Marvin, Wayne S.; Solt, Floyd R.; and Smith, Troy F., 4,930,977, Cl. 414-790.800.
SMS Schloemann-Siemag Aktiengesellschaft: *See*—
Grenz, Gunter; and Kohlstedde, Werner, 4,930,715, Cl. 242-83.000.
Snow, J.Wendell: *See*—
Schwarz, Meyer; Klun, Jerome A.; and Snow, J.Wendell, 4,931,032, Cl. 514-546.000.
Snyder, Stephen L. Powered airfoil canopy aircraft. 4,930,724, Cl. 244-13.000.
Snyder, Thomas E. Method and system for measuring clarified intensity of emotion. 4,931,934, Cl. 364-419.000.
Societe Anonyme dite : SMH Alcatel: *See*—
Vermesse, Bernard, 4,931,943, Cl. 364-464.020.
Societe Anonyme dite : Stein Industrie: *See*—
Belleride, Paul; and Duhamel, Maurice, 4,931,612, Cl. 219-60.00R.
Societe d'Applications Generales d'Electricite: *See*—
Fournier, Joel, 4,931,679, Cl. 310-71.000.
Societe Technique de Pulverisation - STEP SA: *See*—
Brunet, Michel; Di Giovanni, Patrick; Jouillat, Claude; Lina, Jean-Pierre; and Pennaneac'h, Herve , 4,930,999, Cl. 417-552.000.
Sodler, Walter: *See*—
Kuhlmann, Otto; Sodler, Walter; and Stadler, Eberhard, 4,930,588, Cl. 177-212.000.
Soerewyn, Herman V. D.: *See*—
Reifel, Harry C.; Erdag, Eren; and Soerewyn, Herman V. D., 4,931,906, Cl. 361-386.000.
Sofin Ltd.: *See*—
Gerlitz, Jonathan, 4,930,868, Cl. 350-3.700.
Soft Energy Co., Ltd.: *See*—
Saito, Osamu; Iwano, Kazuko; and Ikeda, Yasushi, 4,930,839, Cl. 297-338.000.
Solberg, Mark A., to Morton Thiokol, Inc. Variable orifice diverter valve. 4,930,541, Cl. 137-875.000.
Solis, Javier A.: *See*—
Keller, Glenn J.; and Solis, Javier A., 4,931,751, Cl. 332-108.000.
Solitron Devices, Inc.: *See*—
Fuhrmann, Norbert; and Friedman, Nick, 4,931,793, Cl. 340-903.000.
Solt, Floyd R.: *See*—
Beeman, John A.; Leep, James L.; Marvin, Wayne S.; Solt, Floyd R.; and Smith, Troy F., 4,930,977, Cl. 414-790.800.
Solvay & Cie (Societe Anonyme): *See*—
Prest, Jean-Luc, 4,931,478, Cl. 521-73.000.
Somero, David W.: *See*—
Quenzi, Philip J.; Somero, David W.; and Somero, Paul J., 4,930,935, Cl. 404-75.000.
Somero, Paul J.: *See*—
Quenzi, Philip J.; Somero, David W.; and Somero, Paul J., 4,930,935, Cl. 404-75.000.
Sommerfeld, Klaus-Dieter: *See*—
Lamberts, Wilhelm; Sommerfeld, Klaus-Dieter; Bielefeldt, Dietmar; Marhold, Albrecht; and Negele, Michael, 4,931,482, Cl. 521-131.000.
Sonar International, Inc.: *See*—
Lynch, Thomas E., 4,932,009, Cl. 367-153.000.
Sondages Injections Forages "S.I.F." Enterprise Bachy: *See*—
Charlier, Jacques; Dupeuble, Paul; and Gessay, Jean-Claude, 4,930,940, Cl. 405-267.000.
Song, Suk-Zu; Mehta, Surendra C.; Murthy, Kuchi S.; Nesbitt, Russell U.; and Fawzi, Mahdi B., to Warner-Lambert Company. Copolymers from n-alkyl-3-alkenylene-2-pyrrolidone. 4,931,519, Cl. 526-258.000.
Sonnewald, Ursula, to Novo Industri A/S. Amino acid derivatives. 4,931,450, Cl. 514-326.000.
Sonobe, Tadasi; Ueda, Shinjiro; Ikeguchi, Takashi; Matsumoto, Manabu; and Kuroishi, Kazuo, to Hitachi, Ltd.; and Hitachi Service Engineering, Ltd. Synchrotron radiation source and method of making the same. 4,931,744, Cl. 328-235.000.
Sonoco Products Company: *See*—
Wilfong, Harry B., Jr.; and Haenni, Edwin W., 4,930,385, Cl. 225-106.000.
Sonoda, Takakuni, to Brother Kogyo Kabushiki Kaisha. Method of recording a plurality of images in superposition on a recording medium. 4,932,068, Cl. 355-77.000.
Sonomed, Inc.: *See*—
Henriksen, William; Katz, Louis; and Wuchinich, David G., 4,930,512, Cl. 128-661.060.
Sonta, Hiromi; and Shiratori, Toshikazu, to Dowa Mining Co., Ltd. Method of treating H_2S containing gases. 4,931,262, Cl. 423-220.000.
Sony Corporation: *See*—
Arakawa, Nobuyuki; Suzuki, Hirotsugu; and Nishihara, Tokihiro, 4,931,313, Cl. 427-164.000.
Ishiwata, Koji; and Tobita, Satoru, 4,931,927, Cl. 364-300.000.
Putman, Rob R.; and George, Kevin, 4,931,809, Cl. 343-882.000.
Taguchi, Keiich; and Yanamoto, Kaoru, 4,931,888, Cl. 360-77.040.
Wada, Takuya, 4,931,628, Cl. 235-454.000.
Yoshida, Tadao; Fujiie, Kazuhiko; and Ando, Ryo, 4,932,016, Cl. 369-48.000.
Soos, James L.: *See*—
McDonald, Alexander C.; and Soos, James L., 4,931,206, Cl. 252-180.000.
Soptei, Csaba: *See*—
Pelyva, Jeno ; Soptei, Csaba; Kolonics, Zoltan; Karacsonyi, Bela; Balint, Sandor; Benczik, Janosne ; Kayos, Csaba; Lendvai, Laszlo ; and Laszlo, Sandor, 4,931,585, Cl. 562-17.000.
Sorenson, Roderick J.: *See*—
Connor, David T.; Mullican, Michael D.; Sorenson, Roderick J.; and Thuesen, David O., 4,931,459, Cl. 514-381.000.
Sorg GmbH & Co. KG: *See*—
Pieper, Helmut, 4,932,035, Cl. 373-32.000.
Sosnowski, Robert: *See*—
Gordon, Robert L.; Rehm, Robert E.; and Sosnowski, Robert, 4,930,682, Cl. 229-123.300.
Soucie, Wayne L.: *See*—
Boyer, Billy G.; Nelson, Lloyd M.; Soucie, Wayne L.; and Hayes, William K., 4,930,605, Cl. 188-2.00D.
Sourgen, Laurent: *See*—
Fruhauf, Serge; and Sourgen, Laurent, 4,932,053, Cl. 380-4.000
Southern Integrity, Inc.: *See*—
Abramson, Monte, 4,931,770, Cl. 340-541.000.
Southern Lure Company: *See*—
Cunningham, Roy D., 4,930,246, Cl. 43-42.280.
Southwestern Analytical Chemicals, Inc.: *See*—
Dutcher, John S.; Sharifian, Hossein; and Tanner, Alan R., 4,931,155, Cl. 204-72.000.
Hale, Cecil H.; and Sharifian, Hossein, 4,931,154, Cl. 204-59.00R.
Spacher, Paul F.; and Vadas, David J., to Alliance Automations Systems, Inc. Multiple gripper turret for part handling devices and method of handling parts. 4,930,976, Cl. 414-744.800.
Spada, Frederick E., to Eastman Kodak Company. Long life magnetoresistive head of the non-shunt bias type. 4,931,892, Cl. 360-113.000.
Spaggiari, Terzino, to SPAL s.r.l. One-piece support and end cover structure for electric motors. 4,931,681, Cl. 310-89.000.
Spak, Mark A.; Mammato, Donald; Durham, Dana; and Jain, Sangya, to Hoechst Celanese Corporation. Image reversal negative working O-quinone diazide and cross-linking compound containing photoresist process with thermal curing treatment. 4,931,381, Cl. 430-325.000.
SPAL s.r.l.: *See*—
Spaggiari, Terzino, 4,931,681, Cl. 310-89.000.
Sparks, Gregory E.: *See*—
Boe, Thomas E.; Bergene, Mark A.; Kittle, Carl E.; and Sparks, Gregory E., 4,931,967, Cl. 364-571.010.
Sparling, Francis: *See*—
Koppitsch, Heinrich; and Sparling, Francis, 4,931,741, Cl. 324-525.000.
Spectra-Physics, Inc.: *See*—
Rando, Joseph F., 4,930,263, Cl. 51-165.710.
Thayer, William J., 4,931,687, Cl. 313-231.010.
Spectrum Contracting, Inc.: *See*—
Ward, Lonnie R., 4,930,285, Cl. 52-743.000.
Speedling Incorporated: *See*—
Todd, George K., Sr., 4,930,253, Cl. 47-65.000.
Speicher, Edwin W., to M. E. Cunningham Company. Apparatus for movably supporting an object to be marked. 4,930,912, Cl. 400-48.000.
Speranza, George P.: *See*—
Waddill, Harold G.; Speranza, George P.; and Su, Wei-Yang, 4,931,528, Cl. 528-94.000.
Sperry Marine Inc.: *See*—
Baginski, Mark J., 4,931,792, Cl. 340-870.190.
Goradia, Dhanvant H.; Phillips, Fred W.; and Schluge, Gregory, 4,932,036, Cl. 375-1.000.
Spierings, Gijsbertus A. C. M.: *See*—
Angenent, Johannes H.; Heijman, Maritza G. J.; and Spierings, Gijsbertus A. C. M., 4,931,077, Cl. 65-31.000.

Spies, Hans: *See—*
Albrecht, Hans; Reiniger, Siegfried; Lauer, Wolfgang; Spies, Hans; Laucht, Horst; and Spies, Martin, 4,931,767, Cl. 340-425.500.

Spies, Martin: *See—*
Albrecht, Hans; Reiniger, Siegfried; Lauer, Wolfgang; Spies, Hans; Laucht, Horst; and Spies, Martin, 4,931,767, Cl. 340-425.500.

Spooner, Richard C. Bar stock support. 4,930,381, Cl. 82-163.000.

Spoor, David: *See—*
Isle, Brian A.; Bloom, Charles P.; Butler, Arch W.; and Spoor, David, 4,931,950, Cl. 364-513.000.

Sport Maska Inc.: *See—*
Cote, Denis, 4,930,162, Cl. 2-161.00A.

Sporzynski, Robert S.; Evans, Anthony C.; and Robinette, Richard T., to Kelsey-Hayes Company. Disc brake rotor. 4,930,606, Cl. 188-218.0XL.

Sprague Electric Company: *See—*
Heron, John B., Jr., 4,931,901, Cl. 361-321.000.

Springman, Charles G., to AMSTED Industries, Incorporated. Article carrying member for conveyor chain. 4,930,620, Cl. 198-803.010.

Springs Industries, Inc.: *See—*
Tolbert, Thomas W.; Dugan, Jeffrey S.; Cauthen, John V.; and Hendrix, James E., 4,931,342, Cl. 428-90.000.

Sproul, Richard M.: *See—*
Lane, Andrew R.; and Sproul, Richard M., 4,930,573, Cl. 166-120.000.

SPS Technologies, Inc.: *See—*
Doherty, Roger D.; Singh, Rishi P.; and Slaney, John S., 4,931,255, Cl. 420-586.000.

Square D Company: *See—*
Backes, James J., 4,931,909, Cl. 361-399.000.
Cole, Anthony R., 4,931,898, Cl. 361-361.000.
Cole, Anthony R., 4,931,902, Cl. 361-354.000.
Cole, Anthony R., 4,931,903, Cl. 361-359.000.
Glennon, Oliver; and Zylstra, Henry J., 4,931,893, Cl. 361-45.000.
Kimbrough, Robert L.; and Chapman, Donald L., 4,931,597, Cl. 174-48.000.

Square D Starkstrom GmbH: *See—*
Lemmer, Helmut; and Risthaus, Josef, 4,931,757, Cl. 335-131.000.

SRI International: *See—*
Swidler, Ronald, 4,931,067, Cl. 8-657.000.

Srinivasan, Kollengode V.; Herrington, Leo P.; Basaly, Mores A.; and Poulsen, Harold W., to Novamax Technologies Holdings Inc. Method for two step electrolytic coloring of anodized aluminum. 4,931,151, Cl. 204-376.000.

Stacker, Gunther H.: *See—*
Gebhardt, Arne W.; Muller, Horst G.; and Stacker, Gunther H., 4,931,877, Cl. 358-335.000.

Stadler, Eberhard: *See—*
Kuhlmann, Otto; Sodler, Walter; and Stadler, Eberhard, 4,930,588, Cl. 177-212.000.

Stadtfeld, Hermann, to Werkzeugmaschinenfabrik Oerlikon-Buhrle. Apparatus for adjusting the drums of a bevel-gear cutting machine. 4,930,950, Cl. 409-27.000.

Stahl, Brad. Marine propeller and hub assembly of plastic. 4,930,987, Cl. 416-93.00A.

Stanley Works, The: *See—*
Ketchpel, Paul A., 4,930,227, Cl. 33-755.000.
Mullaney, Richard L., Jr., 4,931,366, Cl. 428-622.000.

Stanton, James L.: *See—*
Buhlmayer, Peter; Rasetti, Vittorio; Fuhrer, Walter; Stanton, James L.; and Goschl, Richard, 4,931,591, Cl. 564-165.000.

Stapleton, Alan L., to Quantel Limited. Video image creation systems. 4,931,956, Cl. 364-521.000.

Staresina, Stjepan; and Rowe, John A., to In-Ve-Nit International Inc. Composite cementitious building panels. 4,930,278, Cl. 52-315.000.

STC PLC: *See—*
Windus, Geoffrey G., 4,932,038, Cl. 375-4.000.

Stead, Cecil V.: *See—*
Quayle, Arthur; and Stead, Cecil V., 4,931,550, Cl. 534-724.000.

Steenson, Larry R.: *See—*
Klaenhammer, Todd R.; Sanozky, Rosemary B.; and Steenson, Larry R., 4,931,396, Cl. 435-252.300.

Steer, Peter L., to E. R. Squibb and Sons, Inc. Low profile ostomy bag coupling. 4,931,045, Cl. 604-338.000.

Stefanakis, Stamatios. Egg storing and processing machine. 4,930,409, Cl. 99-484.000.

Stefenel, Rudolph S.: *See—*
Emmons, Lawrence D.; Mackley, James S.; Stokes, David H.; Stefenel, Rudolph S.; Brisko, William E., Jr.; and Cooper-Hart, Michael A., 4,932,047, Cl. 379-53.000.

Steffens, Michael, to G. Walter Steffens GmbH & Co. Cutter head for cutters. 4,930,709, Cl. 241-282.200.

Stegmeier, Karlheinz: *See—*
Friebe, Walter-Gunar; Reinholz, Erhard; Doerge, Liesel; and Stegmeier, Karlheinz, 4,931,462, Cl. 514-419.000.

Stegmuller, Peter: *See—*
Rehner, Helmut; Bartl, Knut; Stegmuller, Peter; Tischer, Wilhelm; and Rollinger, Sibylle, 4,931,392, Cl. 435-188.000.

Steinberg, Gabriel: *See—*
Dev, Roger H.; Steinberg, Gabriel; Kam, John B.; and Comer, Stewart A., 4,932,026, Cl. 370-94.100.

Steiner Company, Inc.: *See—*
Holzner, Charles R., Sr., 4,930,667, Cl. 222-189.000.
Holzner, Charles R., Sr., 4,931,224, Cl. 261-30.000.

Steiner, Karl; Mullner, Josef; Schiel, Christian; and Flamig, Hans, to J. M. Voith GmbH. Long-nip roll press with eccentric travel path of press shell. 4,931,142, Cl. 162-358.000.

Steiner Silidur AG Andelfingen: *See—*
Winkler, Bernhard, 4,930,283, Cl. 52-611.000.

Stendel, Wilhelm: *See—*
Jensen-Korte, Uta; Schallner, Otto; Stetter, Jorg; Becker, Benedikt; Behrenz, Wolfgang; Stendel, Wilhelm; and Andrews, Peter, 4,931,461, Cl. 514-404.000.

Stephenson, Stanley V.: *See—*
Berryman, Leslie N.; Horinek, Herbert J.; Phillippi, Max L.; Prucha, David A.; Reidenbach, Vincent G.; and Stephenson, Stanley V., 4,930,576, Cl. 166-308.000.

Steppe, Erich; and Beth, Dieter, to Mannesmann Aktiengesellschaft. Office machine, in particular matrix printer. 4,930,918, Cl. 400-719.000.

Sterling Drug Inc.: *See—*
Ray, Jefferson L.; and Cooper, Michael E., 4,931,043, Cl. 604-228.000.

Stern, Christian: *See—*
Surber, Werner; Iqbal, Abul; and Stern, Christian, 4,931,566, Cl. 548-453.000.

Stetter, Jorg: *See—*
Jensen-Korte, Uta; Schallner, Otto; Stetter, Jorg; Becker, Benedikt; Behrenz, Wolfgang; Stendel, Wilhelm; and Andrews, Peter, 4,931,461, Cl. 514-404.000.

Stevens, Gregory A.: *See—*
Volkmann, Curtis L.; Kester, John J.; and Stevens, Gregory A., 4,931,125, Cl. 156-272.800.

Steyr-Daimler-Puch AG: *See—*
Zedrosser, Ulrich, 4,930,241, Cl. 42-100.000.

Stiegler GmbH Maschinenfabrik: *See—*
Wagner, Robert, 4,931,034, Cl. 493-203.000.

Stier, Sam S.; and Kaufman, Robert E. Prefabricated, slip-resistant surface coating. 4,931,330, Cl. 428-40.000.

Stierman, Roger J.; and Lessard, Robert J., to Texas Instruments Incorporated. Fixture and a method for plating contact bumps for integrated circuits. 4,931,149, Cl. 204-15.000.

Stinton, Robert T.: *See—*
Long, Richard W.; and Stinton, Robert T., 4,931,335, Cl. 428-57.000.

Stockhausen, William F., to Ford Motor Company. Ice with single intake valve and dual intake manifold runners. 4,930,468, Cl. 123-188.00M.

Stoddard, James C.; and Tweedy, Ernest P., to GTE Laboratories Incorporated. Methods of and apparatus for the generation of split-screen video displays. 4,931,872, Cl. 358-183.000.

Stoica, Susana, to Control Data Corporation. Flexible imbedded test system for VLSI circuits. 4,931,722, Cl. 371-22.500.

Stokes, David H.: *See—*
Emmons, Lawrence D.; Mackley, James S.; Stokes, David H.; Stefenel, Rudolph S.; Brisko, William E., Jr.; and Cooper-Hart, Michael A., 4,932,047, Cl. 379-53.000.

Stolle Corporation, The: *See—*
McEldowney, Carl, 4,930,658, Cl. 220-269.000.

Stone, William C.: *See—*
Kasoff, James A.; and Stone, William C., 4,932,045, Cl. 377-24.200.

Stout, Mike F.; and Brunken, Dean, to Advanced Chemical Technologies Company. Method for applying a water repellant composition with a water carrier. 4,931,319, Cl. 427-421.000.

Strang, Harry: *See—*
Findeisen, Kurt; Lindig, Markus; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 4,931,084, Cl. 71-92.000.

Strassner, John B.: *See—*
Aidlin, Stephen H.; Reed, Bradley E.; and Strassner, John B., 4,930,327, Cl. 72-148.000.

Strata Flotation, Inc.: *See—*
Johenning, John B., 4,930,172, Cl. 5-451.000.

Strategic Financial Communications Corp.: *See—*
Baldwin, Judith A. M.; and Selwyn, Stephen, 4,930,925, Cl. 402-30.000.

Stratus Computer, Inc.: *See—*
Baty, Kurt F.; and Lamb, Joseph M., 4,931,922, Cl. 364-200.000.

Striedieck, Walter, to Schering Aktiengesellschaft. Method of breaking foam, and arrangement for the same. 4,931,072, Cl. 55-87.000.

Strohmaier, Karl G.: *See—*
Vaughan, David E. W.; and Strohmaier, Karl G., 4,931,267, Cl. 423-328.000.

Strojny, Edwin J.: *See—*
Priester, Ralph D., Jr.; Strojny, Edwin J.; and Stutts, Debra H., 4,931,487, Cl. 521-163.000.

Stroucken, Klaus, to Alfa-Laval Separation AB. Centrifugal separator. 4,930,412, Cl. 494-70.000.

Studna, Amabrose A.: *See—*
Aspnes, David E.; Bhat, Rajaram; Colas, Etienne G.; Florez, Leigh T.; Harbison, James P.; and Studna, Amabrose A., 4,931,132, Cl. 156-601.000.

Stumpf, Thomas R. Resealable cap for a container. 4,930,689, Cl. 222-487.000.

Sturtevant, Alfred H.: *See—*
Mack, Daniel R.; Sturtevant, Alfred H.; and Schwartz, Henry L., 4,931,256, Cl. 422-65.000.

Stutts, Debra H.: *See—*
Priester, Ralph D., Jr.; Strojny, Edwin J.; and Stutts, Debra H., 4,931,487, Cl. 521-163.000.

Su, Wei-Yang: *See*—
Waddill, Harold G.; Speranza, George P.; and Su, Wei-Yang, 4,931,528, Cl. 528-94.000.
Succari, Shmuel; Gilad, Shalev; Nagler, Michael; Beiber, Avigdor; and Berman, Dov, to Scitex Corporation Ltd. Scanner utilizing a particular light guide. 4,931,637, Cl. 250-235.000.
Suda, Osamu: *See*—
Hasegawa, Masaru; Suda, Osamu; Kohno, Hisao; Sekino, Toshifumi; Umezaki, Tetsuhiro; and Tanaka, Norio, 4,931,349, Cl. 430-58.000.
Suda, Shinji: *See*—
Kobayashi, Hiroshi; and Suda, Shinji, 4,931,790, Cl. 340-825.640.
Sudilovsky, Abraham; and Horovitz, Zola P., to E. R. Squibb & Sons, Inc. Method for preventing or treating anxiety employing an ACE inhibitor. 4,931,430, Cl. 514-19.000.
Suga, Takayuki, to Kabushiki Kaisha Toshiba. Image forming apparatus. 4,931,834, Cl. 355-200.000.
Sugano, Kazuhiko, to Nissan Motor Co., Ltd. System for engaging lock-up clutch at highest speed ratios of different operation ranges. 4,930,372, Cl. 475-65.000.
Sugata, Masao: *See*—
Takagi, Hiroshi; Ohmi, Kazuaki; Sugata, Masao; Tsuda, Hisanori; and Ishiwatari, Takahiko, 4,931,692, Cl. 313-503.000.
Sugawara, Katuo; Takahashi, Akio; Katagiri, Junichi; Nagai, Akira; Ono, Masahiro; and Narahara, Toshikazu, to Hitachi, Ltd. Composition comprising poly(p-hydroxystrese) derivative, epoxy-modified polybutadiene and aromatic maleimide. 4,931,507, Cl. 525-193.000.
Sugimoto, Masatoshi: *See*—
Yagishita, Shigeru; Sugimoto, Masatoshi; and Okita, Tomoaki, 4,931,509, Cl. 525-208.000.
Sugita, Shuichi; Nakagawa, Satoshi; and Shimada, Naoko, to Konica Corporation. Silver halide photographic light-sensitive material. 4,931,383, Cl. 430-551.000.
Sugita, Toshio; Funamoto, Hiroyuki; Furuta, Kazuyoshi; and Koseki, Osamu, to Department of Electrical Engineering, Science University of Tokyo; and Seiko Instruments, Inc. Method of correcting defect of patterned article. 4,931,307, Cl. 427-38.000.
Sugitani, Tatsuo: *See*—
Yamanoue, Kouichi; Akita, Shigeyuki; Tanaka, Hiroaki; Sugitani, Tatsuo; and Inoue, Hideo, 4,931,727, Cl. 324-172.000.
Sugiyama, Akira: *See*—
Nakashima, Mitsuyoshi; Kanamaru, Mitsutaka; Sugiyama, Akira; and Terakawa, Masato, 4,931,440, Cl. 514-259.000.
Sugiyama, Takeshi, to Mitsubishi Denki Kabushiki Kaisha. Side mounting starter with bevel gear output. 4,931,680, Cl. 310-83.000.
Sugiyama, Yoshie: *See*—
Takasugi, Hisashi; Kuno, Atsushi; Sakai, Hiroyoshi; Sugiyama, Yoshie; and Takaya, Takao, 4,931,453, Cl. 514-252.000.
Sumita, Mitsutaka, to Mitsubishi Denki Kabushiki Kaisha. Wire electrode vertically setting method and device for wire cut electric discharge machine. 4,931,614, Cl. 219-69.120.
Sumita, Takeshi: *See*—
Matsuoka, Masahiro; Akimoto, Keiichi; Sumita, Takeshi; Tomosada, Tsuyoshi; and Ishikawa, Isao, 4,931,483, Cl. 521-137.000.
Sumitomo Chemical Company, Limited: *See*—
Takagishi, Hisao; Kanagawa, Shuichi; Kamio, Kunimasa; and Sumiyoshi, Kazuo, 4,931,515, Cl. 525-504.000.
Sumitomo Light Metal Industries, Ltd.: *See*—
Baba, Takeaki; Nanba, Keizo; Takeshima, Yoshio; Sano, Hiromichi; Tobita, Koji; Muneto, Atsuo; Hara, Toshihiro; and Fujise, Kazuki, 4,931,340, Cl. 428-73.000.
Sumitomo Rubber Industries, Ltd.: *See*—
Takehara, Kenji; and Takada, Yoshiyuki, 4,930,559, Cl. 152-531.000.
Sumiyoshi, Kazuo: *See*—
Takagishi, Hisao; Kanagawa, Shuichi; Kamio, Kunimasa; and Sumiyoshi, Kazuo, 4,931,515, Cl. 525-504.000.
Sun, Rickson: *See*—
Sampson, Craig F.; Sun, Rickson; Barsley, Paul N.; and Boyle, Dennis J., 4,930,911, Cl. 400-28.000.
Sun, Robert J. Enclosure forming adaptors and related apparatus. 4,931,329, Cl. 428-36.920.
Sundar, Parameshwaran S., to Chevron Research Company. Cleanup of oily wastes. 4,931,161, Cl. 208-13.000.
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Grimm, Duane H., 4,930,611, Cl. 192-139.000.
Metcalf, Jeffrey D., 4,930,312, Cl. 60-442.000.
Nguyen, Vietson M.; and Dhyanchand, John J., 4,931,919, Cl. 363-37.000.
Quick, David C., 4,930,730, Cl. 244-224.000.
Shekleton, Jack R., 4,930,306, Cl. 60-39.360.
Suomala, John, to Underwater Acoustics Systems, Inc. Fish behavior control system. 4,932,007, Cl. 367-139.000.
Surber, Werner; Iqbal, Abul; and Stern, Christian, to Ciba-Geigy Corporation. Process for the preparation of pyrrolo[3,4-c]pyrroles. 4,931,566, Cl. 548-453.000.
Surco Products, Inc.: *See*—
Zlotnik, Arnold; Zlotnik, Milton; and Austin, John A., 4,931,258, Cl. 422-124.000.
Sutherland, Charles A.: *See*—
Manwell, Robert E.; and Sutherland, Charles A., 4,930,757, Cl. 266-270.000.
Suto, Takeshi: *See*—
Suwa, Kyoichi; Ushida, Kazuo; Suto, Takeshi; Kameyama, Masaomi; Hirukawa, Shigeru; and Nakamura, Shinichi, 4,931,830, Cl. 355-71.000.
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Kanai, Naritoshi; and Suzuki, Akira, 4,931,036, Cl. 600-18.000.
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Suzuki, Hideo: *See*—
Baba, Masatoshi; Tanaka, Norio; and Suzuki, Hideo, 4,931,565, Cl. 548-363.000.
Suzuki, Hideyuki: *See*—
Fukaya, Masaki; Kawakami, Soichiro; Itabashi, Satoshi; Terada, Katsunori; Gofuku, Ihachiro; Nakagawa, Katsumi; Hatanaka, Katsunori; Isobe, Yoshinori; Saika, Toshihiro; Kaneko, Tetsuya; Kitahara, Nobuko; and Suzuki, Hideyuki, 4,931,661, Cl. 250-578.100.
Suzuki, Hirotsugu: *See*—
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Kugimiya, Shuzo; Fukumochi, Yoji; Nakamura, Ichiko; Hirai, Tokuyuki; and Suzuki, Hitoshi, 4,931,936, Cl. 364-419.000.
Suzuki Jidosha Kogyo Kabushiki Kaisha: *See*—
Daikoku, Keisuke; and Umehara, Kazuhiro, 4,930,475, Cl. 123-339.000.
Noyori, Takahiro, 4,930,480, Cl. 123-440.000.
Ozaki, Tadayuki, 4,930,472, Cl. 123-198.00E.
Suzuki, Makoto; Mizuno, Shigeru; Sangyoji, Kazuo; and Takagi, Osamu, to Brother Kogyo Kabushiki Kaisha. Image recording apparatus provided with exposure unit using cathode ray tube. 4,931,825, Cl. 355-20.000.
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Hieda, Teruo; Suzuki, Masao; and Narita, Hitoshi, 4,931,856, Cl. 358-29.000.
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Nakanishi, Yasuhiro; Ikemoto, Yutaka; and Suzuki, Takashi, 4,930,222, Cl. 374-170.000.
Suzuki, Takeshi; and Kabayama, Mineaki, to Tomita Pharmaceutical Co., Ltd. Oral phosphate ion adsorbent. 4,931,289, Cl. 424-690.000.
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Suzumura, Nobuyasu: *See*—
Kawata, Shoji; Miyake, Osamu; Suzumura, Nobuyasu; and Takeuchi, Motohide, 4,931,939, Cl. 364-426.040.
Sveen, Frode: *See*—
Granger, Stanley W.; Beard, Joseph O.; and Sveen, Frode, 4,930,745, Cl. 251-1.100.
Svennebrink, Jan: *See*—
Ekerot, Sven; and Svennebrink, Jan, 4,930,755, Cl. 266-44.000.
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Swedberg, Sally A., to Hewlett-Packard Company. Capillary tube with reduced protein interactions and controllable electroosmotic flow. 4,931,328, Cl. 428-36.910.
Swidler, Ronald, to SRI International. Method or dyeing using phase change dyestuffs. 4,931,067, Cl. 8-657.000.
Swisher, Thomas W.: *See*—
Brown, Robert D.; Hogsett, Russell J.; Compton, Richard A.; and Swisher, Thomas W., 4,930,621, Cl. 198-831.000.
Symons Corporation: *See*—
Fulton, William R., 4,930,937, Cl. 405-149.000.
Symons, Robert S.; and Kirshner, Mark F., to Litton Systems, Inc. Coupled cavity circuit with increased iris resonant frequency. 4,931,694, Cl. 315-3.500.
Symons, Robert S., to Litton Systems, Inc. High performance extended interaction output circuit. 4,931,695, Cl. 315-5.390.
Synthelabo: *See*—
Sevrin, Mireille; George, Pascal; and Morel, Claude, 4,931,449, Cl. 514-291.000.
Syre, Jean-Claude; Westphal, Harald; and Hailperin, Max, to European Computer-Industry Research Centre GmbH. Method and a system for processing logic programs. 4,931,931, Cl. 364-300.000.
Systemvagnar AB: *See*—
Pihlstrom, Anund; and Pihlstrom, Bernt, 4,930,799, Cl. 280-400.000.
Szayer, Geza J.: *See*—
Finch, Harry E.; and Szayer, Geza J., 4,930,563, Cl. 160-271.000.
Szego, Andrew, to Explosafe North America Inc. Storage vessel for liquefied gas at ambient temperature. 4,930,651, Cl. 220-88.00A.
Tabs, Inc.: *See*—
Gilliam, Mark A., 4,930,951, Cl. 411-14.000.
Tada, Minoru: *See*—
Shiiki, Hitoshi; Tada, Minoru; and Nakamura, Kyoichi, 4,931,477, Cl. 521-58.000.

Tadauchi, Yukio, to Minolta Camera Kabushiki Kaisha. Image recording system capable of forming image area by area. 4,931,875, Cl. 358-300.000.

Tadokoro, Eiichi: *See*—
Hirano, Masato; and Tadokoro, Eiichi, 4,931,378, Cl. 430-264.000.

Taguchi, Keiichi; and Yanamoto, Kaoru, to Sony Corporation. Tracking servo control for disc drive. 4,931,888, Cl. 360-77.040.

Taguchi, Kenichi; and Watanabe, Masataka, to Shin-Etsu Handotai Company Limited. Method of controlling floating zone. 4,931,945, Cl. 364-477.000.

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Hirami, Akira; and Taguchi, Yasuhiro, 4,931,969, Cl. 364-709.150.

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Horiuchi, Takao; Arai, Izumi; and Tahara, Yoshifumi, 4,931,135, Cl. 156-643.000.

Tajima, Junji, to NEC Corporation. Semiconductor memory device with improved capacitor structure. 4,931,849, Cl. 357-23.600.

Tajima, Yoshimitsu; and Mohri, Motoo, to Sharp Kabushiki Kaisha. Method for the production of a carbon electrode. 4,931,240, Cl. 264-81.000.

Takada, Yoshiyuki: *See*—
Takehara, Kenji; and Takada, Yoshiyuki, 4,930,559, Cl. 152-531.000.

Takada, Yuji, to Sharp Kabushiki Kaisha. Copying apparatus. 4,931,880, Cl. 358-453.000.

Takagi, Hiroshi; Ohmi, Kazuaki; Sugata, Masao; Tsuda, Hisanori; and Ishiwatari, Takahiko, to Canon Kabushiki Kaisha. Luminescing member, process for preparation thereof, and electroluminescent device employing same. 4,931,692, Cl. 313-503.000.

Takagi, Osamu: *See*—
Suzuki, Makoto; Mizuno, Shigeru; Sangyoji, Kazuo; and Takagi, Osamu, 4,931,825, Cl. 355-20.000.

Takagi, Shiro; and Sato, Minoru, to Kabushiki Kaisha Toshiba. Image information processing apparatus. 4,931,957, Cl. 364-521.000.

Takagishi, Hisao; Kanagawa, Shuichi; Kamio, Kunimasa; and Sumiyoshi, Kazuo, to Sumitomo Chemical Company, Limited. Method for producing encapsulated semiconductor from improved epoxy resins. 4,931,515, Cl. 525-504.000.

Takahashi, Akio: *See*—
Sugawara, Katuo; Takahashi, Akio; Katagiri, Junichi; Nagai, Akira; Ono, Masahiro; and Narahara, Toshikazu, 4,931,507, Cl. 525-193.000.

Takahashi, Fumitaka; Okazaki, Kunio; Shiraishi, Masaru; Takahashi, Masayuki; Obara, Kazufumi; Yorimoto, Koji; and Tanabe, Tohru, to Honda Giken Kogyo Kabushiki Kaisha & Stanley Electric Co. Gas rate sensor. 4,930,349, Cl. 73-497.000.

Takahashi, Hiroshi, to Konica Corporation. Camera boosting circuit. 4,931,824, Cl. 354-484.000.

Takahashi, Hisao: *See*—
Suzuki, Takumi; Uehara, Kiyohiro; and Takahashi, Hisao, 4,930,876, Cl. 350-336.000.

Takahashi, Junichi, to Sanden Corporation. Refrigerated display case with night cover. 4,930,321, Cl. 62-249.000.

Takahashi, Kenji: *See*—
Hosoi, Yuichi; Takahashi, Kenji; and Arakawa, Satoshi, 4,931,642, Cl. 250-327.200.

Takahashi, Koji: *See*—
Nakayama, Tadayoshi; Sato, Chikara; Nagasawa, Kenichi; Satatani, Tomohiko; Yoshimura, Katsuji; Takahashi, Koji; and Kozuki, Susumu, 4,932,066, Cl. 382-56.000.

Takahashi, Masakatsu, to Ricoh Company, Ltd. Communication apparatus with a remotely adjustable signal level function. 4,931,988, Cl. 364-900.000.

Takahashi, Masanori: *See*—
Torigai, Katsumi; and Takahashi, Masanori, 4,931,025, Cl. 440-1.000.

Takahashi, Masayuki: *See*—
Takahashi, Fumitaka; Okazaki, Kunio; Shiraishi, Masaru; Takahashi, Masayuki; Obara, Kazufumi; Yorimoto, Koji; and Tanabe, Tohru, 4,930,349, Cl. 73-497.000.

Takahashi, Satoru: *See*—
Shigematsu, Masahiro; Ohi, Hideo; Kusano, Shoji; Miyazawa, Takeshige; Takahashi, Satoru; Toyokawa, Yasuhumi; and Kajiwara, Ikuo, 4,931,087, Cl. 71-93.000.

Takahashi, Shinya: *See*—
Matsuzawa, Yoshinori; and Takahashi, Shinya, 4,931,820, Cl. 354-402.000.

Takahashi, Takehiko; Ishii, Yoshiyasu; and Matsuda, Hiroaki, to Combi Co., Ltd. Shopping basket for use with stroller. 4,930,697, Cl. 224-275.000.

Takahashi, Takeshi: *See*—
Takahashi, Yasuyuki; Yoshida, Toshiro; and Takahashi, Takeshi, 4,931,210, Cl. 252-314.000.

Takahashi, Yasuo; and Hojima, Toshinari, to Kato Hatsujo Kaisha, Ltd. Hose clamp. 4,930,191, Cl. 24-20.00R.

Takahashi, Yasuyuki; Yoshida, Toshiro; and Takahashi, Takeshi, to Menji Milk Products Company Limited. Process for producing a W/O/W type multiple emulsion for medicines, cosmetics, etc. 4,931,210, Cl. 252-314.000.

Takahashi, Yoshiharu: *See*—
Otsuka, Katsuyuki; Takahashi, Yoshiharu; and Tamai, Hideaki, 4,931,153, Cl. 204-39.000.

Takakura, Makoto; Hori, Takahiro; Sakaguchi, Yuriko; and Nakamura, Yuji, to Nissan Chemical Industries Ltd. Method for preventing hardened cementitious material from deteriorating. 4,931,314, Cl. 427-140.000.

Takakuwa, Yoshio: *See*—
Sasaki, Takeshi; Takakuwa, Yoshio; Haruna, Takayuki; and Yamada, Kiyoharu, 4,930,380, Cl. 82-117.000.

Takamori, Yoh: *See*—
Mitsuishi, Naoki; Matsubara, Kiyoshi; Takamori, Yoh; and Ozawa, Yoshiyuki, 4,931,997, Cl. 365-218.000.

Takaniemi, Tauno, to Vendmatic Oy. Cutting apparatus. 4,930,379, Cl. 82-101.000.

Takano, Toshiya: *See*—
Kobayashi, Shoichi; Mikuni, Katsuhiko; Monma, Mitsuru; Takano, Toshiya; Hara, Kozo; and Hashimoto, Hitoshi, 4,931,389, Cl. 435-95.000.

Takasago Electric Industry Co., Ltd.: *See*—
Hamano, Junichi, 4,931,128, Cl. 156-362.000.

Takase, Hiroshi; Goto, Hisashi; Inoue, Takashi; Sakurai, Hidenori; and Kimura, Akiteru, to Olympus Optical Co., Ltd. Image pickup optical system. 4,930,881, Cl. 350-445.000.

Takasugi, Hisashi; Kuno, Atsushi; Sakai, Hiroyoshi; Sugiyama, Yoshie; and Takaya, Takao, to Fujisawa Pharmaceutical Company, Ltd. Di phenylpyridazine compounds, processes for the preparation thereof and pharmaceutical compositions comprising the same. 4,931,453, Cl. 514-252.000.

Takata, Naoto; Kanai, Seita; Araki, Nobuhiro; and Udo, Tadashi, to Mazda Motor Corporation. Vehicle rear suspension system. 4,930,805, Cl. 280-690.000.

Takaya, Takao: *See*—
Takasugi, Hisashi; Kuno, Atsushi; Sakai, Hiroyoshi; Sugiyama, Yoshie; and Takaya, Takao, 4,931,453, Cl. 514-252.000.

Takaya, Tsuguo: *See*—
Matsuda, Tatsuhito; Funae, Yasuaki; Yoshida, Masahiro; and Takaya, Tsuguo, 4,931,521, Cl. 526-286.000.

Take, Hiroshi: *See*—
Mitsumune, Toshifumi; Take, Hiroshi; and Nakazawa, Kiyoshi, 4,930,874, Cl. 350-333.000.

Takeda, Hiroaki; Ishida, Masato; Abe, Eiichi; and Sato, Isamu, to Canon Kabushiki Kaisha. Image recording apparatus with evening of the recording medium. 4,931,882, Cl. 358-474.000.

Takeda, Susumu, to Brother Kogyo Kabushiki Kaisha. Display system with fewer display memory chips. 4,931,958, Cl. 364-521.000.

Takehana, Sakae; Ueda, Yasuhiro; Gotanda, Masakazu; Sakurai, Tomohisa; and Adachi, Hideyuki, to Olympus Optical Co., Ltd. Apparatus for bending an insertion section of an endoscope using a shape memory alloy. 4,930,494, Cl. 128-4.000.

Takehara, Kenji; and Takada, Yoshiyuki, to Sumitomo Rubber Industries, Ltd. Pneumatic tire. 4,930,559, Cl. 152-531.000.

Takei, Masahiro; and Shinbori, Kenichi, to Canon Kabushiki Kaisha. Recording apparatus which is capable of recording two kinds of signals by operation of a single member. 4,931,878, Cl. 358-335.000.

Takei, Terutaka; Morita, Shigeru; Togoshi, Yoshikazu; and Kawahara, Yoshihiro, to Kubota Ltd. Front mower. 4,930,296, Cl. 56-11.300.

Takei, Tetsuya: *See*—
Iida, Shigehira; Arai, Takayoshi; Hashizume, Junichiro; Takei, Tetsuya; and Saitoh, Keishi, 4,930,442, Cl. 118-723.000.

Takei, Yoshiaki; and Sakai, Eiichi, to Konica Corporation. Polycarbonate-containing photoreceptors containing a hindered phenol compound. 4,931,372, Cl. 430-66.000.

Takekawa, Yoriyuki; and Oshizawa, Hidekazu, to Diesel Kiki Co., Ltd. Control apparatus for automobile air-conditioners. 4,930,698, Cl. 236-49.300.

Takemura, Yasuhiko: *See*—
Sakai, Masato; Umeda, Itsuki; Takeuchi, Yasuo; and Takemura, Yasuhiko, 4,931,499, Cl. 525-194.000.

Takemura, Yoshinari: *See*—
Nagashima, Michiyoshi; and Takemura, Yoshinari, 4,932,015, Cl. 369-44.110.

Takenaka, Yuji, to Fuji Photo Film Co., Ltd. Method of specifying frame number. 4,931,832, Cl. 355-77.000.

Takeo, Tadashi: *See*—
Yamamoto, Tohru; Takeo, Tadashi; Ichinose, Kiyohiro; Ozawa, Syogo; Fujii, Kenji; Fujii, Saburo; Enomoto, Mashayuki; Ishibashi, Ichiro; and Murayama, Junichi, 4,931,322, Cl. 427-421.000.

Takeshima, Yoshio: *See*—
Baba, Takeaki; Nanba, Keizo; Takeshima, Yoshio; Sano, Hiromichi; Tobita, Koji; Muneto, Atsuo; Hara, Toshihiro; and Fujise, Kazuki, 4,931,340, Cl. 428-73.000.

Takeuchi, Kunihiko; Akita, Yoshisuke; and Hayakawa, Osamu, to Tokyo Keiki Company Ltd. Control apparatus of variable delivery pump. 4,930,992, Cl. 417-20.000.

Takeuchi, Motohide: *See*—
Kawata, Shoji; Miyake, Osamu; Suzumura, Nobuyasu; and Takeuchi, Motohide, 4,931,939, Cl. 364-426.040.

Takeuchi, Shinichi: *See*—
Motegi, Ryohei; Takeuchi, Shinichi; and Sato, Toshio, 4,930,358, Cl. 73-861.280.

Takeuchi, Yasuo: *See*—
Sakai, Masato; Umeda, Itsuki; Takeuchi, Yasuo; and Takemura, Yasuhiko, 4,931,499, Cl. 525-194.000.

Takikawa, Kazunori; and Ono, Yuichi, to Usui Kokusai Sangyo Kaisha Ltd. Thermosensitive hydraulic fan coupling. 4,930,458, Cl. 123-41.120.

Takizawa, Yoshio: *See*—
Akimoto, Kunio; Ikeuchi, Satoru; and Takizawa, Yoshio, 4,931,375, Cl. 430-109.000.

Tamai, Hideaki: *See*—
Otsuka, Katsuyuki; Takahashi, Yoshiharu; and Tamai, Hideaki, 4,931,153, Cl. 204-39.000.

Tamai, Kunio, to Usui Kokusai Sangyo Kaisha Ltd. Temperature-operated fluid friction coupling. 4,930,457, Cl. 123-41.120.

Tamai, Shoji; Ohta, Masahiro; Kawashima, Saburo; Iiyama, Katsuaki; Oikawa, Hideaki; and Yamaguchi, Akihiro, to Mitsui Toatsu Chemicals, Incorporated. Polyimide and high-temperature adhesive thereof. 4,931,531, Cl. 528-172.000.

Tamata, Shin: *See*—
Baba, Tsutomu; Kawamura, Fumio; Chino, Koichi; Tsuchiya, Kiroyuki; Kikuchi, Makoto; and Tamata, Shin, 4,931,222, Cl. 252-628.000.

Tamiya, Toshihiko, to Hitachi, Ltd. Data recording and reading system. 4,932,014, Cl. 369-48.000.

Tamura, Takamitsu: *See*—
Akabane, Yasuhiro; Tamura, Takamitsu; and Fujiwara, Masami, 4,931,562, Cl. 546-19.000.

Tan, Samantha S. H., to Balazs Analytical Laboratory. Liquids sampler. 4,930,360, Cl. 73-864.340.

Tanabe Machinery Co., Ltd.: *See*—
Toriyama, Daigoro, 4,930,830, Cl. 294-88.000.

Tanabe, Tohru: *See*—
Takahashi, Fumitaka; Okazaki, Kunio; Shiraishi, Masaru; Takahashi, Masayuki; Obara, Kazufumi; Yorimoto, Koji; and Tanabe, Tohru, 4,930,349, Cl. 73-497.000.

Tanabe, Tsuneaki: *See*—
Fukawa, Isaburo; and Tanabe, Tsuneaki, 4,931,530, Cl. 528-125.000.

Tanaka, Atsushi: *See*—
Kaneko, Kiyoshi; Tanaka, Atsushi; Yoshimura, Yuichiro; Kobayashi, Katsuyuki; and Taniishi, Shinnosuke, 4,931,965, Cl. 364-560.000.

Tanaka, Eishi: *See*—
Asano, Makoto; Tsutsumi, Haruki; Tanaka, Eishi; Fuseya, Yoshiro; Hasegawa, Kiyoharu; and Akahori, Hiroyuki, 4,931,420, Cl. 503-205.000.

Tanaka, Hiroaki: *See*—
Yamanoue, Kouichi; Akita, Shigeyuki; Tanaka, Hiroaki; Sugitani, Tatsuo; and Inoue, Hideo, 4,931,727, Cl. 324-172.000.

Tanaka, Hiroyuki: *See*—
Kawachi, Shoji; Tomoda, Masayasu; Oka, Masahiko; Furukawa, Yasuyoshi; and Tanaka, Hiroyuki, 4,931,511, Cl. 525-326.300.

Tanaka, Kenji: *See*—
Nakao, Motokazu; Tojo, Tomotarou; and Tanaka, Kenji, 4,931,862, Cl. 358-75.000.

Tanaka Kikinzoku Kogyo: *See*—
Watanabe, Masahiro; Motoo, Satoshi; and Furuya, Nagakazu, 4,931,168, Cl. 204-284.000.

Tanaka, Minoru: *See*—
Kasukabe, Susumu; Ookubo, Masasi; Akiba, Yutaka; Tanaka, Minoru; and Yokono, Hitoshi, 4,931,726, Cl. 324-158.00F.

Tanaka, Mitsuhiro: *See*—
Ikematsu, Takeshi; Hattori, Yasuo; Inoki, Yoshihiro; and Tanaka, Mitsuhiro, 4,931,376, Cl. 526-164.000.

Tanaka, Norio: *See*—
Baba, Masatoshi; Tanaka, Norio; and Suzuki, Hideo, 4,931,565, Cl. 548-363.000.
Hasegawa, Masaru; Suda, Osamu; Kohno, Hisao; Sekino, Toshifumi; Umezaki, Tetsuhiro; and Tanaka, Norio, 4,931,349, Cl. 430-58.000.

Tanaka, Satoru, to Pioneer Electronic Corporation. Laser scanning apparatus and method of scanning using same. 4,930,849, Cl. 350-6.600.

Tanaka, Toshiyuki; Kuga, Shigeki; Morishita, Taro; Nakamura, Nobuo; and Ohsaki, Mikio, to Sharp Kabushiki Kaisha. Inputting system and an editing system in an inquiry-and-answer system. 4,931,926, Cl. 364-419.000.

Tanaka, Toyoaki; Ohira, Katuzi; Nakamura, Akira; Kamei, Ryosuke; and Hashimoto, Akihiro, to Showa Denko Kabushiki Kaisha. Apparatus for the production of elastic absorbent. 4,931,005, Cl. 425-83.100.

Tanaka, Yoshiaki: *See*—
Ohtsuki, Tomonari; Inoue, Takakatsu; and Tanaka, Yoshiaki, 4,931,622, Cl. 235-487.000.

Tanaka, Yoshinori: *See*—
Nakamura, Koichiro; and Tanaka, Yoshinori, 4,931,623, Cl. 235-488.000.

Tandem Computers Incorporated: *See*—
Khan, Aurangzeb K., 4,931,672, Cl. 307-475.000.
Robinson, Richard P.; and Neilson, Joseph S., 4,931,907, Cl. 361-391.000.

Tanielian, Minas H., to Boeing Company, The. Structure and method for selectively producing a conductive region on a substrate. 4,931,353, Cl. 437-200.000.

Taniguchi, Hisayuki, to Dainippon Screen Mfg. Co., Ltd. Method of and apparatus for correcting color pattern in multicolor process. 4,931,861, Cl. 358-75.000.

Taniguchi, Masato: *See*—
Kawamura, Mitsuyoshi; and Taniguchi, Masato, 4,930,546, Cl. 138-149.000.

Taniishi, Shinnosuke: *See*—
Kaneko, Kiyoshi; Tanaka, Atsushi; Yoshimura, Yuichiro; Kobayashi, Katsuyuki; and Taniishi, Shinnosuke, 4,931,965, Cl. 364-560.000.

Tannahill, Bernice B. Needle threader. 4,930,871, Cl. 350-243.000.

Tannehill, John B.: *See*—
Tannehill, John M.; and Tannehill, John B., 4,930,795, Cl. 280-33.992.

Tannehill, John M.; and Tannehill, John B. Rotary display for shopping cart. 4,930,795, Cl. 280-33.992.

Tanner, Alan R.: *See*—
Dutcher, John S.; Sharifian, Hossein; and Tanner, Alan R., 4,931,155, Cl. 204-72.000.

Tansey, John A.; Davey, Rodney J.; and Sadler, Alan A., to BICC plc; and Corning Limited. Propellable optical fiber cables. 4,930,860, Cl. 350-96.230.

Tanuma, Jiro: *See*—
Kikuchi, Hiroshi; Tanuma, Jiro; Ishimizu, Hideaki; and Kasai, Tadashi, 4,930,915, Cl. 400-175.000.

Tanzawa, Misao; and Endo, Shuichi, to Ricoh Company, Ltd. Cleaning device. 4,931,840, Cl. 355-298.000.

Taravella, Salvatore R.: *See*—
Volk, Joseph; and Taravella, Salvatore R., 4,930,287, Cl. 52-748.000.

Tardy, Michel; and Tayot, Jean-Louis, to Imedex; and Institut Merieux. Process for the treatment of collagen, notably for facilitating its cross-linking, and the collagen obtained by the application of the said process. 4,931,546, Cl. 530-356.000.

Tarizzo, Jeffrey R.: *See*—
Slovinsky, Manuel; and Tarizzo, Jeffrey R., 4,931,347, Cl. 428-192.000.

Tarumi, Noriyoshi: *See*—
Demizu, Hiromi; Obu, Makoto; Yano, Hidetoshi; Seimiya, Ryubun; and Tarumi, Noriyoshi, 4,930,438, Cl. 118-651.000.

Tasse, Yvon. Method of securing plastic roll to metal core roller. 4,930,205, Cl. 29-450.000.

Tattermusch, Peter; and Bartel, Gunter, to Daimler-Benz AG. Independent wheel suspension for motor vehicles. 4,930,804, Cl. 280-690.000.

Taub, Howard H.: *See*—
Pan, Alfred I.; Taub, Howard H.; and Levie, Harold W., 4,931,813, Cl. 346-140.00R.

Taurus Gumiipari Vallalat: *See*—
Fogarasi, Gabor; Sivo, Imre; Zacsek, Gabor; and Zakarias, Istvan, 4,931,004, Cl. 425-28.100.

Taurus Impressions, Inc.: *See*—
Sampson, Craig F.; Sun, Rickson; Barsley, Paul N.; and Boyle, Dennis J., 4,930,911, Cl. 400-28.000.

Taylor, Christopher L. Universal precision measuring gauge. 4,930,221, Cl. 33-811.000.

Taylor, Julian S. Pipeline road crossing sealing system. 4,930,536, Cl. 137-70.000.

Tayot, Jean-Louis: *See*—
Tardy, Michel; and Tayot, Jean-Louis, 4,931,546, Cl. 530-356.000.

TDK Corporation: *See*—
Hashizume, Kenji; Okamura, Masatoshi; and Shiba, Haruo, 4,930,714, Cl. 242-71.800.

TDW Delaware, Inc.: *See*—
Smith, Dennis R., 4,930,223, Cl. 33-302.000.

Tecan AG Analytische Instrumente: *See*—
Abplanalp, Heinz, 4,931,402, Cl. 435-291.000.

Techne Corporation: *See*—
Lucas, Roger C.; Weatherbee, James A.; and Tsang, Monica L.-S., 4,931,548, Cl. 530-399.000.

Technitrol, Inc.: *See*—
Gaudino, Larry J., 4,930,211, Cl. 29-623.500.

Technology Research Corporation: *See*—
Legatti, Raymond, 4,931,894, Cl. 361-45.000.

Tecnodelta S.A.: *See*—
Mantovani, Elis, 4,930,956, Cl. 409-233.000.

Tecnoma: *See*—
Ballu, Patrick J., 4,930,531, Cl. 134-167.00R.

Tecton Laminates Corp.: *See*—
Feichtmeir, Raymond A.; Cothrell, LeRoy E.; Moon, Jack E.; and Turner, Ted R., 4,931,113, Cl. 156-64.000.

Teijin Limited: *See*—
Matsumura, Shunichi; Inata, Hiroo; Umetani, Hiroyuki; and Okada, Masuhiro, 4,931,512, Cl. 525-333.300.

Teijin Seiki Company Limited: *See*—
Toyama, Kiyoshi, 4,931,634, Cl. 250-225.000.
Toyama, Kiyoshi, 4,931,635, Cl. 250-225.000.

Tektronix, Inc.: *See*—
Veenendaal, Cornelis T., 4,930,858, Cl. 350-96.200.

Tekulve, Daniel R.: *See*—
Laskowski, Donald R.; and Tekulve, Daniel R., 4,930,386, Cl. 83-399.000.

Teledyne Industries, Inc.: *See*—
Guajardo, Ciro, 4,931,778, Cl. 340-664.000.

Teledyne Inet: *See*—
Lee, Robert H.; Levran, Alexander; Mak, Chi; Smith, Gerald L.; and Marcinkowski, Jacek J., 4,931,715, Cl. 318-709.000.

Telefunken Electronic GmbH: *See*—
Haag, Ernst; Haag, Gunter; Leitner, Georg; and Farnbauer-Schmidt, Konrad, 4,931,794, Cl. 341-31.000.

Telenova, Inc.: *See*—
Keeney, Clare G.; Passon, Gary L.; Hagen, Ronald J.; Foster, Chris D.; and Fritsch, Frank J., 4,932,022, Cl. 370-60.000.

Temperature Research Corporation: *See*—
Klein, Phillip P., 4,930,317, Cl. 62-3.300.

Tennant, William A.: *See*—
Kudert, Frederick G.; Latreille, Maurice G.; McHenry, Robert J.; Nahill, George F.; Pfutzenreuter, Henry, III; Tennant, William A.; Tung, Thomas T.; and Vella, John, Jr., 4,931,246, Cl. 264-241.000.

Tenneco Canada Inc.: *See*—
Fredette, Maurice C. J.; and Yang, Ching-Shi, 4,931,268, Cl. 423-479.000.

Teodorescu, Ionel E.: *See*—
Cummings, Joel W.; and Teodorescu, Ionel E., 4,931,057, Cl. 606-153.000.

Teppo, Maynard, to American Colloid Company. Method for manufacturing discrete pellets of asphaltic material. 4,931,231, Cl. 264-13.000.

Terada, Katsunori: *See*—
Fukaya, Masaki; Kawakami, Soichiro; Itabashi, Satoshi; Terada, Katsunori; Gofuku, Ihachiro; Nakagawa, Katsumi; Hatanaka, Katsunori; Isobe, Yoshinori; Saika, Toshihiro; Kaneko, Tetsuya; Kitahara, Nobuko; and Suzuki, Hideyuki, 4,931,661, Cl. 250-578.100.

Terada, Yasuharu; Horita, Yoshiyuki; and Ishii, Susumu, to Yoshida Kogyo K. K. Double lockable sliders. 4,930,323, Cl. 70-68.000.

Teraji, Tsutomu: *See*—
Kamiya, Takashi; Saito, Yoshihisa; Teraji, Tsutomu; Nakaguit, Osamu; Oku, Teruo; Nakamura, Hitoshi; and Hashimoto, Masashi, 4,931,555, Cl. 540-222.000.

Terakawa, Masato: *See*—
Nakashima, Mitsuyoshi; Kanamaru, Mitsutaka; Sugiyama, Akira; and Terakawa, Masato, 4,931,440, Cl. 514-259.000.

Terashima, Kanetsugu: *See*—
Furukawa, Kenji; and Terashima, Kanetsugu, 4,931,208, Cl. 252-299.610.

Teruhisa, Kaneda: *See*—
Yoshifumi, Murata; Teruhisa, Kaneda; Kazuo, Hara; Katsunori, Takamoto; Isao, Ohonishi; and Shinichi, Yokota, 4,931,538, Cl. 528-292.000.

Terwilliger, Richard A., to Diasonics, Inc. Ultrasound probe with multi-orientation tip-mounted transducer. 4,930,515, Cl. 128-662.060.

Texaco Chemical Company: *See*—
Waddill, Harold G.; Speranza, George P.; and Su, Wei-Yang, 4,931,528, Cl. 528-94.000.

Texas Ignitors Company, Inc.: *See*—
Dietrich, Rainer, 4,930,473, Cl. 123-266.000.

Texas Instruments Incorporated: *See*—
Brighton, Jeffrey E., 4,931,144, Cl. 174-262.000.
Goff, Larry; King, Lawrence A.; Barnett, Daniel B.; and Justice, Samuel P., 4,931,745, Cl. 330-9.000.
Houston, Theodore W., 4,932,002, Cl. 365-241.000.
Manitt, James; and Hull, Scott, 4,931,323, Cl. 427-53.100.
Scharrer, Carl J., 4,932,027, Cl. 370-112.000.
Stierman, Roger J.; and Lessard, Robert J., 4,931,149, Cl. 204-15.000.
Tigelaar, Howard L.; Haken, Roger A.; Holloway, Thomas C.; and Groover, Robert, III, 4,931,411, Cl. 437-192.000.

Tezuka, Kazuhiko: *See*—
Fujita, Masafumi; Saijo, Takao; and Tezuka, Kazuhiko, 4,931,828, Cl. 355-45.000.

TH. Goldschmidt AG: *See*—
Zaifkovits, Wilhelm; Gruning, Burghard; Kollmeier, Hans-Joachim; Schaefer, Dietmar; and Weitemeyer, Christian, 4,931,362, Cl. 428-402.220.

Thakoor, Anilkumar P.: *See*—
Ramesham, Rajeshuni; Thakoor, Anilkumar P.; and Lambe, John J., 4,931,763, Cl. 338-22.0SD.

Thayer, William J., to Spectra-Physics, Inc. Spark gap switch having a two-phase fluid flow. 4,931,687, Cl. 313-231.010.

Theeuwes, Felix: *See*—
Edgren, David E.; and Theeuwes, Felix, 4,931,285, Cl. 424-473.000.

Thermal Designs, Inc.: *See*—
Hune, Ronald G., 4,931,249, Cl. 264-279.100.

Thibeault, Deborah M.: *See*—
Thibeault, Richard A.; and Thibeault, Deborah M., 4,930,654, Cl. 220-253.000.

Thibeault, Richard A.; and Thibeault, Deborah M. Reseslable flip-top can. 4,930,654, Cl. 220-253.000.

Thomas & Betts Corporation: *See*—
Brush, Robert W., Jr.; Scharf, Robert M.; Davie, Campbell; Lutsky, Arthur A.; and Siano, Frank S., 4,930,200, Cl. 29-25.420.

Thomas Industries Inc.: *See*—
Scherf, Timothy P.; Dix, Daniel J.; and Carson, Douglas W., 4,931,917, Cl. 362-371.000.

Thomas J. Lipton, Inc.: *See*—
Bee, Rodney D.; and Palmer, Anthony M., 4,930,319, Cl. 62-69.000.

Thompson, Craig E.; and Rowse, Jack H., to Allied-Signal Inc. Pusher propeller installation for turboprop engines. 4,930,725, Cl. 244-53.00R.

Thompson, Jerry R.; and Peters, Martin W. Support system for guitar or like instrument. 4,930,695, Cl. 224-257.000.

Thompson, Ralph F. Package collator machine. 4,931,131, Cl. 156-556.000.

Thomson-Brandt Armements: *See*—
Thouron, Rene ; and Denis, Jean-Francois, 4,930,422, Cl. 102-378.000.

Thomson-CSF: *See*—
Gally, Daniel; and Jobert, Pierre P., 4,931,693, Cl. 313-528.000.
Grillon, Jean; and Moreau, Christian, 4,931,874, Cl. 358-231.000.
Roche, Pascal; and Muoy, Yin H., 4,930,215, Cl. 29-830.000.

Thomson Industries, Inc.: *See*—
Pester, Andrew L.; Mugglestone, Peter R.; and Magee, Robert C., 4,932,067, Cl. 384-45.000.

Thorn EMI plc: *See*—
Sibbald, Alastair; Webb, Brian C.; Robins, Ian; Ross, John F.; and Bell, Edward C., 4,931,851, Cl. 357-25.000.

Thorndyke, Robert J., to Atlantis Transportation Services Inc. Roller track assembly incorporating a mechanical elevator mechanism. 4,930,612, Cl. 193-35.0SS.

Thouron, Rene ; and Denis, Jean-Francois, to Thomson-Brandt Armements. Ejectable, imperviously sealing device especially for rockets with munitions. 4,930,422, Cl. 102-378.000.

Thrall Car Manufacturing Company: *See*—
Ritter, John A.; Tomaka, Jan Z.; and Muda, Jozes A., 4,930,427, Cl. 105-406.100.

Thueson, David O.: *See*—
Connor, David T.; Mullican, Michael D.; Sorenson, Roderick J.; and Thueson, David O., 4,931,459, Cl. 514-381.000.

Tharston, Joña F.; and Golembiewski, Alan L., to Allied-Signal Inc. Fluidic volumetric fluid flow meter. 4,930,357, Cl. 73-861.190.

Tichenor, Clyde L.; Royo, Paris E.; and Fleming, Alex W., to Designs by Royo. Easy viewing device with shielding. 4,930,884, Cl. 350-624.000.

Tideland Signal Corporation: *See*—
Olivenbaum, James E.; and Fischer, Mark C., 4,931,976, Cl. 364-571.040.

Tiegs, Mark D.; and Kurten, Michael J., to Hein-Werner Corporation. Valve resurfacing apparatus and method for making the same. 4,930,261, Cl. 51-105.0VG.

Tigelaar, Howard L.; Haken, Roger A.; Holloway, Thomas C.; and Groover, Robert, III, to Texas Instruments Incorporated. Integrated circuit process with TiN-gate transistor. 4,931,411, Cl. 437-192.000.

Tihansky, Eugene L., to Bethlehem Steel Corporation. Hoisting hooks used to lift, transport and dump metallurgical ladles. 4,930,827, Cl. 294-81.560.

Timex Corporation: *See*—
Schwartz, Herbert, 4,932,011, Cl. 368-185.000.

Ting, Phillip: *See*—
Drake, Craig D.; and Ting, Phillip, 4,931,978, Cl. 364-708.000.

Ting, Tah-Kang J., to American Telephone and Telegraph Company. TTL and CMOS logic compatible GAAS logic family. 4,931,670, Cl. 307-448.000.

Tirez, Peter. Arrangement for jointing two surfboards as a whole. 4,930,433, Cl. 114-61.000.

Tischer, Wilhelm: *See*—
Rehner, Helmut; Bartl, Knut; Stegmuller, Peter; Tischer, Wilhelm; and Rollinger, Sibylle, 4,931,392, Cl. 435-188.000.

Titsworth, Raymond; Lipe, J. Tom; Dale, James L.; Monroe, Hanford D.; and Hill, Jerry M., to FMC Corporation. Vehicle wheel alignment apparatus and method. 4,931,964, Cl. 364-559.000.

Tittel, Eberhard. Attachment, particularly for holding skis, surfboards or the like, for a carrier bar of a carrier structure for fitting externally on a motor vehicle. 4,930,671, Cl. 224-319.000.

Tobing, Singa D., to Servus Rubber Company, Inc. Co-curing of NR/EPDM rubber blends. 4,931,508, Cl. 525-194.000.

Tobita, Koji: *See*—
Baba, Takeaki; Nanba, Keizo; Takeshima, Yoshio; Sano, Hiromichi; Tobita, Koji; Muneto, Atsuo; Hara, Toshihiro; and Fujise, Kazuki, 4,931,340, Cl. 428-73.000.

Tobita, Satoru: *See*—
Ishiwata, Koji; and Tobita, Satoru, 4,931,927, Cl. 364-300.000.

Tochacek, Miroslav: *See*—
Becker, Dennis L.; Tochacek, Miroslav; and Hansen, Paul E., 4,931,343, Cl. 428-95.000.

Tochihara, Shinichi: *See*—
Iwata, Kazuo; Nishiwaki, Osamu; and Tochihara, Shinichi, 4,931,810, Cl. 346-1.100.

Toda, Haruhisa; Fujiwara, Kouhei; Hosogai, Setsuo; and Shioguchi, Kazumi, to Mitsubishi Denki Kabushiki Kaisha. Multipole circuit breaker. 4,931,602, Cl. 200-144.00R.

Toda, Junichi, to Shimano Industrial Company Limited. Drag mechanism for a spinning reel. 4,930,722, Cl. 242-245.000.

Toda, Junichi, to Shimano Industrial Company Limited. Braking force measuring mechanism for a spinning reel. 4,930,723, Cl. 242-245.000.

Todd, George K., Sr., to Speedling Incorporated. Plant growing and handling method. 4,930,253, Cl. 47-65.000.

Toffle, Mark A., to Magnetic Peripherals Inc. Test disk having fluorocarbon resin asperities for magnetic disk drive component testing. 4,931,338, Cl. 428-65.000.

Togoshi, Yoshikazu: *See*—
Takei, Terutaka; Morita, Shigeru; Togoshi, Yoshikazu; and Kawahara, Yoshihiro, 4,930,296, Cl. 56-11.300.

Tohara, Hidekazu: *See*—
Watanabe, Nobuatsu; Tohara, Hidekazu; Matsumura, Yuji; and Fujimoto, Hiroyuki, 4,931,163, Cl. 208-44.000.

Tojo, Tomotarou: *See*—
Nakao, Motokazu; Tojo, Tomotarou; and Tanaka, Kenji, 4,931,862, Cl. 358-75.000.

Tokin Corporation: *See*—
Kogo, Masanori, 4,931,798, Cl. 342-4.000.

Toko Kabushiki Kaisha: *See*—
Kasahara, Takeshi, 4,932,064, Cl. 382-8.000.

Toko, Makoto: *See*—
Obata, Yoshimori; and Toko, Makoto, 4,931,972, Cl. 364-724.130.

Toko, Yoshio, to Mitsubishi Denki Kabushiki Kaisha. Mobile station equipment for a mobile radio telephone system. 4,932,072, Cl. 455-76.000.

Tokuda, Kanji, to Fuji Photo Film Co., Ltd. Electronic photographic printer/enlarger. 4,931,863, Cl. 358-78.000.

Tokunaga, Katsushi: *See*—
Arase, Takuya; Tokunaga, Katsushi; and Daimon, Shigeo, 4,931,198, Cl. 252-62.510.
Tokunaga, Takafumi; Tsuneoka, Masatoshi; and Mizukami, Koichiro, to Hitachi, Ltd. Process for producing semiconductor integrated circuit device having copper interconnections and/or wirings, and device produced. 4,931,410, Cl. 437-189.000.
Tokura, Kengi, to Kyoshin Kogyo Kabushiki Kaisha. Pipe expanding mandrel. 4,930,338, Cl. 72-479.000.
Tokyo Electron Limited: *See*—
Horiuchi, Takao; Arai, Izumi; and Tahara, Yoshifumi, 4,931,135, Cl. 156-643.000.
Tokyo Keiki Co., Ltd.: *See*—
Motegi, Ryohei; Takeuchi, Shinichi; and Sato, Toshio, 4,930,358, Cl. 73-861.280.
Takeuchi, Kunihiko; Akita, Yoshisuke; and Hayakawa, Osamu, 4,930,992, Cl. 417-20.000.
Tolbert, Thomas W.; Dugan, Jeffrey S.; Cauthen, John V.; and Hendrix, James E., to Springs Industries, Inc. Accordion folded laminate of fiber sheet reinforced with thermoplastic film. 4,931,342, Cl. 428-90.000.
Tole, Walter R., to Beta Instrument Co., Ltd. Method and apparatus for dimensional measurement of an object. 4,931,658, Cl. 250-560.000.
Tolman, Richard L., to Merck & Co., Inc. Method for treating certain neoplastic diseases. 4,931,433, Cl. 514-157.000.
Tolmie, Robert J., Jr., to Pitney Bowes Inc. Verification of operability of moistener. 4,930,441, Cl. 118-669.000.
Tomaka, Jan Z.: *See*—
Ritter, John A.; Tomaka, Jan Z.; and Muda, Jozes A., 4,930,427, Cl. 105-406.100.
Tomioka, Kazuhiko, to Kabushiki Kaisha Toshiba. Method for manufacturing semiconductor devices having twin wells. 4,931,406, Cl. 437-27.000.
Tomita, Masami; Kawabata, Toshiyasu; Nanya, Toshiki; and Murayama, Hisao, to Ricoh Company, Ltd. Electrophotographic positive charging toner containing a copper phthalocyanine blue pigment. 4,931,374, Cl. 430-106.000.
Tomita Pharmaceutical Co., Ltd.: *See*—
Suzuki, Takeshi; and Kabayama, Mineaki, 4,931,289, Cl. 424-690.000.
Tomoda, Masayasu: *See*—
Kawachi, Shoji; Tomoda, Masayasu; Oka, Masahiko; Furukawa, Yasuyoshi; and Tanaka, Hiroyuki, 4,931,511, Cl. 525-326.300.
Tomosada, Tsuyoshi: *See*—
Matsuoka, Masahiro; Akimoto, Keiichi; Sumita, Takeshi; Tomosada, Tsuyoshi; and Ishikawa, Isao, 4,931,483, Cl. 521-137.000.
Tompkins, E. Neal; Bartholmae, Jack N.; Zuber, Peter A.; and Charles, Kirk W., to Colorocs Corporation. Transfer system for electrophotographic print engine. 4,931,839, Cl. 355-277.000.
Toray Industries, Inc.: *See*—
Hayashida, Shinichiro; Okashiro, Hidetoshi; and Yororu, Shunichi, 4,931,982, Cl. 364-473.000.
Torigai, Katsumi; and Takahashi, Masanori, to Sanshin Kogyo Kabushiki Kaisha. Posture control device for marine vessels. 4,931,025, Cl. 440-1.000.
Torii, Kiyofumi: *See*—
Shikama, Takashi; Wakabayashi, Asami; and Torii, Kiyofumi, 4,931,626, Cl. 219-540.000.
Torii, Nobutoshi: *See*—
Toyoda, Kenichi; Torii, Nobutoshi; Mizuno, Hitoshi; and Miyawaki, Masanao, 4,931,617, Cl. 219-125.100.
Toriyama, Daigoro, to Tanabe Machinery Co., Ltd. Box blank holding device in box-making machine. 4,930,830, Cl. 294-88.000.
Tornero, Lino E. Hinged height adjusting device. 4,930,840, Cl. 297-353.000.
Toro Company, The: *See*—
Zenner, Michael N., 4,930,298, Cl. 56-17.400.
Torocsik, Laszlo : *See*—
Simonyi, Sandor; Torocsik, Laszlo ; and Valoczi, Gyorgy, 4,930,374, Cl. 74-866.000.
Toronto Medical Corp.: *See*—
Saringer, John H., 4,930,497, Cl. 128-25.00R.
Torstensson, Lars-Gunnar; Dahlqvist, Per-Arne; and Benjelloun, Malika, to EKA Nobel AB. Method of preparing iron(III) phosphate compounds for iron fortification of food products. 4,931,292, Cl. 426-2.000.
Tosaka, Akio; Sakata, Kei; Hashiguchi, Koichi; Higashino, Tateo; and Ichida, Toshio, to Kawasaki Steel Corporatich. Hot rolled steel sheet having high resistances against secondary-work embrittlement and brazing embrittlement and adapted for ultra-deep drawing and a method for producing the same. 4,931,106, Cl. 148-12.00C.
Tosswill, Christopher H., to Galileo Electro-Optics Corp. Multifunction gas triode. 4,931,688, Cl. 313-336.000.
'totes' Incorporated: *See*—
Allen, James H., 4,930,533, Cl. 135-20.00R.
Toyama, Kiyoshi, to Teijin Seiki Company Limited. Optical position sensor using Kerr effect and a magnetic scale. 4,931,634, Cl. 250-225.000.
Toyama, Kiyoshi, to Teijin Seiki Company Limited. Optical position sensor using Faraday effect element and magnetic scale. 4,931,635, Cl. 250-225.000.
Toyo Chemical Laboratories, Inc.: *See*—
Fujisawa, Mutsuo; Kameda, Tsutomu; Katsura, Hirofumi; Yamaga, Reiichi; and Ishido, Setsuko, 4,931,096, Cl. 106-35.000.
Toyoda Gosei Co., Ltd.: *See*—
Yagishita, Shigeru; Sugimoto, Masatoshi; and Okita, Tomoaki, 4,931,509, Cl. 525-208.000.
Toyoda, Kenichi; Torii, Nobutoshi; Mizuno, Hitoshi; and Miyawaki, Masanao, to Fanuc Ltd. Electrically conductive coating for cover of industrial robot. 4,931,617, Cl. 219-125.100.
Toyokawa, Yasuhumi: *See*—
Shigematsu, Masahiro; Ohi, Hideo; Kusano, Shoji; Miyazawa, Takeshige; Takahashi, Satoru; Toyokawa, Yasuhumi; and Kajiwara, Ikuo, 4,931,087, Cl. 71-93.000.
Toyota Jidosha Kabushiki Kaisha: *See*—
Nakawaki, Yasunori; Ushijima, Fumihiro; Numazawa, Akio; and Asada, Toshiyuki, 4,930,373, Cl. 475-128.000.
Osawa, Kouichi; Shibata, Norio; and Abe, Shinichi, 4,930,479, Cl. 123-436.000.
Weir, Richard L.; and Pearsall, Jeannine A., 4,931,413, Cl. 501-31.000.
Yamanoue, Kouichi; Akita, Shigeyuki; Tanaka, Hiroaki; Sugitani, Tatsuo; and Inoue, Hideo, 4,931,727, Cl. 324-172.000.
Tranergy Corporation: *See*—
Kumar, Sudhir; and Kumar, Shiv R., 4,930,600, Cl. 184-3.200.
Trankle, Gunther; and Deckenbach, Gottfried, to Licentia Patent-Verwaltungs-GmbH. Controllable broadband amplifier and mixer which includes the amplifier. 4,931,746, Cl. 330-254.000.
Trask, Thomas W.: *See*—
Albares, Donald J.; Cavanaugh, David B.; and Trask, Thomas W., 4,930,854, Cl. 350-96.170.
Travelsoft, Inc.: *See*—
Dalnekoff, Stanley; and Schneider, Michael L., 4,931,932, Cl. 364-407.000.
Trevor, John, Jr. High volume automatic and semi-automatic firearm. 4,930,399, Cl. 89-191.020.
Trimble, Lloyd E.: *See*—
Radwanski, Fred R.; Trimble, Lloyd E.; Chambers, Leon E., Jr.; and Connor, Linda A., 4,931,355, Cl. 428-283.000.
Tropix, Inc.: *See*—
Bronstein, Irena Y.; and Voyta, John C., 4,931,223, Cl. 252-700.000.
Edwards, Brooks; and Voyta, John C., 4,931,569, Cl. 549-221.000.
Trummlitz, Gunter: *See*—
Engel, Wolfhard; Trummlitz, Gunter; Eberlein, Wolfgang; Mihm, Gerhard; Mayer, Norbert; De Jonge, Adriaan; and Rudolf, Klaus, 4,931,436, Cl. 514-220.000.
Truth Incorporated: *See*—
Pettit, Dean A.; and Vetter, Gregory J., 4,930,820, Cl. 292-204.000.
Trutzschler GmbH & Co. KG: *See*—
Leifeld, Ferdinand, 4,930,190, Cl. 19-105.000.
TRW Inc.: *See*—
Clark, George L.; Heflinger, Lee O.; Roychoudhuri, Chandrasekhar; Brooks, Robert E.; and Sharma, Madan M., 4,930,855, Cl. 350-96.190.
Tsang, Monica L.-S.: *See*—
Lucas, Roger C.; Weatherbee, James A.; and Tsang, Monica L.-S., 4,931,548, Cl. 530-399.000.
Tsuchida, Eishun; Nishide, Hiroyuki; Yamamoto, Kimihisa; and YHoshida, Shu, to Idemitsu Petrochemical Company, Limited. Process for preparing a polyarylene thioether. 4,931,542, Cl. 528-373.000.
Tsuchiya, Kiroyuki: *See*—
Baba, Tsutomu; Kawamura, Fumio; Chino, Koichi; Tsuchiya, Kiroyuki; Kikuchi, Makoto; and Tamata, Shin, 4,931,222, Cl. 252-628.000.
Tsuda, Hisanori: *See*—
Takagi, Hiroshi; Ohmi, Kazuaki; Sugata, Masao; Tsuda, Hisanori; and Ishiwatari, Takahiko, 4,931,692, Cl. 313-503.000.
Tsujimoto, Jun-ichi: *See*—
Matsui, Masataka; Tsujimoto, Jun-ichi; Ootani, Takayuki; and Isobe, Mitsuo, 4,931,994, Cl. 365-189.010.
Tsujimura, Osamu: *See*—
Arai, Tatsuo; Saito, Takayoshi; Tsujimura, Osamu; and Hayashizaki, Hiroaki, 4,930,945, Cl. 407-40.000.
Tsujita, Yoshihiro: *See*—
Yoshitake, Kunitoshi; Tsujita, Yoshihiro; and Kakuta, Nobuyuki, 4,930,694, Cl. 224-42.45R.
Tsuk, Andrew G., to American Home Products Corp. (Del). Menthol enhancement of transdermal drug delivery. 4,931,283, Cl. 424-449.000.
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Tsutsumi, Haruki: *See*—
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Yoshioka, Hirosuke; Obata, Tokio; Fujii, Katsutoshi; Yoshiya, Haruo; Tsutsumiuchi, Kiyoshi; and Shikita, Shoji, 4,931,455, Cl. 514-256.000.

Tsvetkov, Alexandr A.: *See*—
Chernyak, Zinovy A.; Tsvetkov, Alexandr A.; Onischenko, Alexandr M.; Kandala, Anatoly I.; Khrapov, Valery G.; Nunuparov, Georgy M.; Slavinsky, Vladimir M.; Geikhman, Isaak L.; Omelchenko, Nikolai P.; Rafalovich, Boris A.; Silaev, Viktor I.; and Zhdanov, Konstantin F., 4,931,638, Cl. 250-253.000.

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Belanger, James A.; Wentworth, Robert J.; Turner, Barry S.; and Astley, Graham J., 4,931,244, Cl. 264-154.000.

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Hamm, Robert N.; Hunter, Scott R.; Hurst, George S.; Turner, James E.; and Wright, Harvel A., 4,931,653, Cl. 250-385.100.

Turner, Ted R.: *See*—
Feichtmeir, Raymond A.; Cothrell, LeRoy E.; Moon, Jack E.; and Turner, Ted R., 4,931,113, Cl. 156-64.000.

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Peterson, Charles D.; Tutt, James R.; and Cody, John, 4,930,965, Cl. 414-149.000.

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Stoddard, James C.; and Tweedy, Ernest P., 4,931,872, Cl. 358-183.000.

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Bartlett, Ian G.; and Lymer, Donald A., 4,931,129, Cl. 156-435.000.

Tyrrell, Stuart G. J.: *See*—
Lowe, Barrie G.; and Tyrrell, Stuart G. J., 4,931,650, Cl. 250-397.000.

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Loffler, Markus, 4,930,395, Cl. 89-8.000.

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Inoue, Hiroshi; and Hirano, Tetsuji, 4,931,365, Cl. 428-458.000.
Yoshioka, Hirosuke; Obata, Tokio; Fujii, Katsutoshi; Yoshiya, Haruo; Tsutsumiuchi, Kiyoshi; and Shikita, Shoji, 4,931,455, Cl. 514-256.000.

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Knebel, Joachim; Kerscher, Volker; and Ude, Werner, 4,931,594, Cl. 568-727.000.

Udell, Randal R., to Arvin Industries, Inc. Noise attenuation apparatus. 4,930,597, Cl. 181-256.000.

Udo, Tadashi: *See*—
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Ueberegger, Heinrich: *See*—
Schwyn, Bernhard; and Ueberegger, Heinrich, 4,931,006, Cl. 425-412.000.

Ueda, Hideki, to NEC Corporation. Transmitter having PLL circuit. 4,932,073, Cl. 455-113.000.

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Ueda, Yasuhiro: *See*—
Takehana, Sakae; Ueda, Yasuhiro; Gotanda, Masakazu; Sakurai, Tomohisa; and Adachi, Hideyuki, 4,930,494, Cl. 128-4.000.

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Suzuki, Takumi; Uehara, Kiyohiro; and Takahashi, Hisao, 4,930,876, Cl. 350-336.000.

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Murakami, Yasuo; Matsumoto, Youichi; and Uemura, Kazuhiro, 4,930,909, Cl. 384-492.000.

Uetake, Toshikazu: *See*—
Komatsu, Kazunori; and Uetake, Toshikazu, 4,931,309, Cl. 427-48.000.

Uhlemann, Hans; Herold, Heiko; Boeck, Reinhard; and Daun, Hans, to Bayer Aktiengesellschaft. Zigzag classifier. 4,931,174, Cl. 209-139.100.

Uji, Akira, to Hiya Pharmaceutical Co., Ltd. Cholagogue and/or gallstone solubilizer. 4,931,475, Cl. 514-729.000.

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Umeki, Tsunenori, to Mitsubishi Denki Kabushiki Kaisha. Access circuit for a semiconductor memory. 4,931,999, Cl. 365-230.010.

Umetani, Hiroyuki: *See*—
Matsumura, Shunichi; Inata, Hiroo; Umetani, Hiroyuki; and Okada, Masuhiro, 4,931,512, Cl. 525-333.300.

Umezaki, Tetsuhiro: *See*—
Hasegawa, Masaru; Suda, Osamu; Kohno, Hisao; Sekino, Toshifumi; Umezaki, Tetsuhiro; and Tanaka, Norio, 4,931,349, Cl. 430-58.000.

Underwater Acoustics Systems, Inc.: *See*—
Suomala, John, 4,932,007, Cl. 367-139.000.

Ungchusri, Tep; and Earl, Paul M., to FMC Corporation. Plastic bore seal. 4,930,791, Cl. 277-151.000.

Uniden America Corporation: *See*—
McCormick, Ben F., II, 4,932,074, Cl. 455-167.000.

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Ficken, Leonard A., 4,930,663, Cl. 221-75.000.

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Foster, George N.; Petty, Herbert E.; Blevins, Charles H., II; and King, Roswell E., III, 4,931,492, Cl. 524-188.000.

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Prasad, Ravi, 4,931,070, Cl. 55-16.000.

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Cheng, Alan T., 4,931,225, Cl. 261-76.000.

Union Oil Company of California: *See*—
Occelli, Mario L., 4,931,266, Cl. 423-326.000.
Young, Donald C., 4,931,061, Cl. 47-57.600.
Young, Donald C., 4,931,079, Cl. 71-77.000.

Unique Chemical Consultant, Ltd.: *See*—
Sasaki, Tadashi, 4,931,170, Cl. 208-348.000.

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Katircioglu, Haluk; De Beule, John A.; Mukherjee, Debaditya; and Whitlock, Gary C., 4,932,028, Cl. 371-16.500.

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Agriculture: *See*—
Chen, Yud-Ren; and Robinson, Steven A., 4,931,933, Cl. 364-409.000.
Miller-Ihli, Nancy J., 4,930,898, Cl. 366-109.000.
Miller, John A.; and Oehler, Delbert D., 4,930,451, Cl. 119-106.000.
Schwarz, Meyer; Klun, Jerome A.; and Snow, J.Wendell, 4,931,032, Cl. 514-546.000.

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Eylon, Daniel; Froes, Francis H.; and Welsch, Gerhard, 4,931,253, Cl. 419-25.000.
Parker, Jack H., Jr.; and DeLong, Mark L., 4,930,352, Cl. 73-662.000.
Reinhardt, Bruce A., 4,931,532, Cl. 528-185.000.

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Burns, Richard H., 4,930,887, Cl. 356-152.000.
McCollum, Tom, 4,931,646, Cl. 250-367.000.
Shimko, Steve R., 4,931,803, Cl. 342-371.000.

Energy: *See*—
Porges, Karl G., 4,930,356, Cl. 73-861.080.

Health and Human Services: *See*—
Martin, Malcolm A.; and Willey, Ronald, 4,931,393, Cl. 435-235.000.

Navy: *See*—
Albares, Donald J.; Cavanaugh, David B.; and Trask, Thomas W., 4,930,854, Cl. 350-96.170.
Ashley, Joseph L.; and Matthews, John D., 4,930,322, Cl. 62-271.000.
Kub, Francis J.; Mack, Ingham A.; and Moon, Keith K., 4,931,674, Cl. 307-529.000.

Secretary the Navy: *See*—
Miyashiro, Stanley K.; Morris, Francis E.; and Roome, Albert T., 4,932,039, Cl. 375-102.000.

U.S. Philips Corp.: *See*—
Angenent, Johannes H.; Heijman, Maritza G. J.; and Spierings, Gijsbertus A. C. M., 4,931,077, Cl. 65-31.000.
Gebhardt, Arne W.; Muller, Horst G.; and Stacker, Gunther H., 4,931,877, Cl. 358-335.000.
Hishiki, Teruo, 4,931,737, Cl. 324-431.000.
Kemner, Rudolf; and Kalmijn, Hilco T., 4,931,734, Cl. 324-318.000.
Kroon, Peter; Deprettere, Edmond F. A.; and Sluyter, Robert J., 4,932,061, Cl. 381-30.000.
Legierse, Petrus E. J.; and van der Hoorn, Gustaaf H. A., 4,931,147, Cl. 204-5.000.

Mayo, William T.; and Embree, Paul M., 4,930,513, Cl. 128-661.090.
Metzler, Ernst, 4,932,025, Cl. 370-85.150.
Overweg, Johannes A.; and Bunk, Paul B., 4,931,735, Cl. 324-318.000.
Pfennings, Leonardus C. M. G.; Vosa, Peter H.; O'Connell, Cormac M.; Phelan, Cathal G.; Davies, Thomas J.; and Ostrop, Hans, 4,931,667, Cl. 307-443.000.
Shannon, John M., 4,931,787, Cl. 340-784.000.
Van Donselaar, Bastiaan J.; and Van Amstel, Willem D., 4,930,889, Cl. 356-237.000.
Van Uden, Maria C., 4,931,689, Cl. 313-402.000.
Van Uijen, Cornelis M. J., 4,932,017, Cl. 369-48.000.
Walters, Nigel J., 4,931,749, Cl. 331-4.000.

United States Shoe Corporation, The: *See*—
Engle, Norman, 4,930,232, Cl. 36-44.000.

United Technologies Corporation: *See*—
Byrnes, Francis E.; and Schmaling, David N., 4,930,983, Cl. 416-134.00A.
Schienda, Gregory A.; and Mayfield, Mark L., 4,930,604, Cl. 187-133.000.

Unitrode Corporation: *See*—
Reifel, Harry C.; Erdag, Eren; and Soerewyn, Herman V. D., 4,931,906, Cl. 361-386.000.

Univ. of Calif., The Regents of the: *See*—
Bunshah, Roistan F.; Desphandey, Chandra V.; and Karim, Aziz A., 4,931,158, Cl. 204-192.290.

Universal Photonix, Inc.: *See*—
Pinnow, Douglas A., 4,931,789, Cl. 340-825.560.

Universite Louis Pasteur: *See*—
Jung, Louis; and Robert, Dominique, 4,931,471, Cl. 514-622.000.

University of Cincinnati: *See*—
Henderson, H. Thurman, 4,930,347, Cl. 73-189.000.

University of Delaware: *See*—
Albisetti, Charles J.; and Castle, John E., 4,931,551, Cl. 536-20.000.

University of Minnesota, Regents of the: *See*—
Vince, Robert; and Hua, Mei, 4,931,559, Cl. 544-276.000.

University of North Dakota School of Engineering & Mines Foundation, The: *See*—
Miller, Stanley J.; and Laudal, Dennis L., 4,931,073, Cl. 55-96.000.

University of Pa.: *See*—
Cutler, Winnifred B.; Preti, George; and Huggins, George R., 4,931,403, Cl. 436-65.000.

University of Tennesse Research Corporation, The: *See*—
Hoffman, Paul S.; Hefsel, Leta O.; Bibb, William F.; and McKinney, Roger M., 4,931,547, Cl. 530-387.000.

University of Tennessee Research Corporation, The: *See*—
Covington, J. Stanaill; McBride, Michael A.; and Hayes, Michael E., 4,931,192, Cl. 210-751.000.

University of Utah: *See*—
Bae, You H.; Okano, Teruo; and Kim, Sung W., 4,931,287, Cl. 424-484.000.

University of Vermont, The: *See*—
Kornecki, Elizabeth H.; and Ehrlich, Yigal H., 4,931,002, Cl. 424-529.000.

Unoki, Masao: *See*—
Miyazaki, Nobuyuki; Unoki, Masao; and Munekata, Seiji, 4,931,505, Cl. 525-125.000.

UOP: *See*—
Kalnes, Tom N., 4,931,165, Cl. 208-100.000.

Upsher Laryngoscope Corporation, The: *See*—
Upsher, Michael S., 4,930,495, Cl. 128-10.000.

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Urdahl, Kent G.: *See*—
Klueh, David R.; Morris, Jack W.; Urdahl, Kent G.; and Zimmer, Matthew K., 4,931,348, Cl. 428-207.000.

Urushima, Teturou, to Matsushita Electric Industrial Co., Ltd. Memory protection arrangement. 4,931,993, Cl. 365-189.010.

Usami, Masashi; Akiba, Shigeyuki; and Matsushima, Yuichi, to Kokusai Denshin Denwa Kabushiki Kaisha. Distributed feedback semiconductor laser device and current injection. 4,932,034, Cl. 372-96.000.

Ushida, Kazuo: *See*—
Suwa, Kyoichi; Ushida, Kazuo; Suto, Takeshi; Kameyama, Masaomi; Hirukawa, Shigeru; and Nakamura, Shinichi, 4,931,830, Cl. 355-71.000.

Ushijima, Fumihiro: *See*—
Nakawaki, Yasunori; Ushijima, Fumihiro; Numazawa, Akio; and Asada, Toshiyuki, 4,930,373, Cl. 475-128.000.

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Usui Kokusai Sangyo Kabushiki Kaisha: *See*—
Kanesaka, Hiroshi, 4,930,315, Cl. 60-600.000.

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Takikawa, Kazunori; and Ono, Yuichi, 4,930,458, Cl. 123-41.120.
Tamai, Kunio, 4,930,457, Cl. 123-41.120.

Utsumi, Tohru; and Sasaki, Tohru, to Kabushiki Kaisha Toshiba. High speed byte data rearranging processor. 4,931,925, Cl. 364-200.000.

Uyama, Tadao: *See*—
Watanabe, Kenji; Uyama, Tadao; Satomi, Norio; Nishikawa, Masahiro; Yamaguchi, Satorou; and Nakazawa, Ichiro, 4,931,251, Cl. 376-128.000.

Vadas, David J.: *See*—
Spacher, Paul F.; and Vadas, David J., 4,930,976, Cl. 414-744.800.

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Pashan, Mark A.; and Vaidya, Avinash K., 4,932,020, Cl. 370-14.000.

Valentin, Siegfried W. Lock for slider mechanism. 4,930,254, Cl. 49-181.000.

Valiga, Richard A.; and Hart, Richard S., to Radio Flyer Inc. Side extension for a toy wagon. 4,930,831, Cl. 296-26.000.

Valko, Joseph T.; Plasynski, Joseph E.; and Miller, Robert D., to PPG Industries, Inc. Epoxy resin advancement using urethane polyols and method for use thereof. 4,931,157, Cl. 204-181.700.

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Dismukes, John P.; Luton, Michael J.; and Vallone, Joseph, 4,931,068, Cl. 51-293.000.

Valmet Oy: *See*—
Karvinen, Mikko; and Laapotti, Jorma, 4,931,143, Cl. 162-360.100.

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Simonyi, Sandor; Torocsik, Laszlo ; and Valoczi, Gyorgy, 4,930,374, Cl. 74-866.000.

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Dessau, Ralph M.; and Valyocsik, Ernest W., 4,931,416, Cl. 502-74.000.

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Barlai, Zoltan; Dorcsi, Geza; Rez, Ferenc; and Vamos, Attila, 4,931,736, Cl. 324-367.000.

VanAcker, Michael, to Chrysler Corporation. Mounting means for vehicle audio device. 4,930,696, Cl. 224-42.45R.

Van Amstel, Willem D.: *See*—
Van Donselaar, Bastiaan J.; and Van Amstel, Willem D., 4,930,889, Cl. 356-237.000.

Vance Products, Inc.: *See*—
Bosley, Rodney W., Jr., 4,930,496, Cl. 128-24.00A.

van der Hoorn, Gustaaf H. A.: *See*—
Legierse, Petrus E. J.; and van der Hoorn, Gustaaf H. A., 4,931,147, Cl. 204-5.000.

Vanderjagt, John A., to Ingersoll-Rand Company. Detachable chemical sprayer. 4,930,702, Cl. 239-157.000.

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VanGinhoven, Robert M., to Ford New Holland, Inc. Blower with energy absorbing housing. 4,930,944, Cl. 406-97.000.

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Crego, John B.; Sheehan, Ronald T.; and VanGinhoven, Robert M., 4,930,530, Cl. 134-6.000.

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Dillard, Homer E.; VanHoogstrate, John A.; and Muffler, Ronald J., 4,931,859, Cl. 358-60.000.

Van Meir, Eugene: *See*—
Angeloz, Corinne; Huerlimann, Peter; and Van Meir, Eugene, 4,930,690, Cl. 222-490.000.

van Rooy, Jacob, to 501 Ocean B.V. Anti-fluttering check valve. 4,930,539, Cl. 137-514.000.

Van Selous, Joseph S., to Ford Motor Company. Minimizing delay in low temperature engagement of automatic transmission clutch or brake. 4,930,376, Cl. 74-867.000.

Van Uden, Maria C., to U.S. Philips Corporation. Color display tube. 4,931,689, Cl. 313-402.000.

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van Zuilichem, Hendrikus C. W. Device for lumbar traction in physiotherapy. 4,930,524, Cl. 128-876.000.

Vapor Technologies Inc.: *See*—
Pinkhasov, Eduard, 4,931,306, Cl. 427-37.000.

Varian Associates, Inc.: *See*—
Klos, Leo V.; and Hertel, Richard J., 4,931,776, Cl. 340-610.000.

Varshneya, Deepak: *See*—
Miers, David R.; Raj, David; and Varshneya, Deepak, 4,930,862, Cl. 350-96.290.

Vasconcellos, Rita L. Denture brush travel case. 4,930,638, Cl. 206-581.000.

Vasile, Vincent R. Apparatus and method of fishing for swimming fish. 4,930,444, Cl. 119-3.000.

Vassallo, Charles: *See*—
Broadwin, Alan; Vassallo, Charles; Logan, Joseph N.; and Hornlein, Robert W., 4,931,047, Cl. 604-22.000.

Vastag Automobiltechnik Gesellschaft m.b.H.: *See*—
Fuchs, Peter, 4,930,817, Cl. 285-189.000.

Vaughan, David E. W.; and Strohmaier, Karl G., to Exxon Research and Engineering Company. Process for preparing a high silica zeolite having the faujasite topology, ECR-32. 4,931,267, Cl. 423-328.000.

Veenendaal, Cornelis T., to Tektronix, Inc. Fiber optic mounting and alignment apparatus. 4,930,858, Cl. 350-96.200.

Vega Automation: *See*—
Buisseau, Jean-Louis, 4,930,291, Cl. 53-458.000.

Veit Transpo GmbH: *See*—
Ponisch, Martin; Hafner, Josef; and Schonenberger, Rolf, 4,930,425, Cl. 104-172.400.

Vella, John, Jr.: *See*—
Knaert, Frederick G.; Latreille, Maurice G.; McHenry, Robert J.; Nahill, George F.; Pfutzenreuter, Henry, III; Tennant, William A.; Tung, Thomas T.; and Vella, John, Jr., 4,931,246, Cl. 264-241.000.

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Takaniemi, Tauno, 4,930,379, Cl. 82-101.000.

Verby, Stanley M.; and Mirsky, Barry. Skylight assembly. 4,930,275, Cl. 52-200.000.

Verhulst, Eduard M.: *See*—
Beck, Heinz; Frassek, Karl-Heinz; Verhulst, Eduard M.; and Giezen, Egenius A., 4,931,197, Cl. 252-56.00R.

Vermesse, Bernard, to Societe Anonyme dite : SMH Alcatel. Franking machine providing a periodic historical trail. 4,931,943, Cl. 364-464.020.

Vescia, Michele: *See*—
Baumgarte, Ulrich; Fikentscher, Rolf; Heimann, Sigismund; Mertens, Heinrich; Schneider, Siegfried; and Vescia, Michele, 4,931,065, Cl. 8-188.000.

Vetter, Gregory J.: *See*—
Pettit, Dean A.; and Vetter, Gregory J., 4,930,820, Cl. 292-204.000.

Vibro Dynamics Corporation: *See*—
Young, Sheldon E.; Young, Michael L.; and Folkens, Jerry D., 4,930,741, Cl. 248-542.000.

Victor Company of Japan, Ltd.: *See*—
Kosaka, Yositeru; and Yamada, Kunio, 4,931,857, Cl. 358-31.000.

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Fukuda, Hisatoshi; and Fujiwara, Hisashige, 4,931,743, Cl. 328-167.000.

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Bottger, Wolfgang; and Biedermann, Kurt, 4,931,345, Cl. 428-116.000.

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Voyta, John C.: *See*—
Bronstein, Irena Y.; and Voyta, John C., 4,931,223, Cl. 252-700.000.
Edwards, Brooks; and Voyta, John C., 4,931,569, Cl. 549-221.000.

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Bijl, Hugo; and Vroklage, Sebastiaan J. W., 4,931,554, Cl. 536-124.000.

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Saleh, Ramzi Y.; and Wachs, Israel E., 4,931,572, Cl. 549-239.000.

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Schmidt, Eric, 4,930,234, Cl. 40-1.500.
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Alfano, Robert R.; and Walser, Ardie D., 4,931,704, Cl. 315-384.000.

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Robinson, Morris D., 4,930,973, Cl. 414-557.000.

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Obrecht, Robert E.; and Waltonen, Edward J., 4,930,203, Cl. 29-243.500.

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Hardt, Heinz; and Wandle, Rudolf, 4,931,369, Cl. 429-98.000.

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Dev, Roger H.; Steinberg, Gabriel; Kam, John B.; and Comer, Stewart A., 4,932,026, Cl. 370-94.100.

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Connor, David T.; Mullican, Michael D.; Sorenson, Roderick J.; and Thueson, David O., 4,931,459, Cl. 514-381.000.
Sharma, Shri C., 4,931,304, Cl. 426-632.000.
Song, Suk-Zu; Mehta, Surendra C.; Murthy, Kuchi S.; Nesbitt, Russell U.; and Fawzi, Mahdi B., 4,931,519, Cl. 526-258.000.

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Taguchi, Kenichi; and Watanabe, Masataka, 4,931,945, Cl. 364-477.000.

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Watkins, Richard L. T. Method for making a reinforced thermosetting resin structure with integral unflanged nozzle. 4,931,119, Cl. 156-173.000.

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Maloney, Michael; and Watson, Linda, 4,930,772, Cl. 273-26.00B.

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Bourgeois, Michel; Chatelin, Roger; and Wattiez, Daniel, 4,931,577, Cl. 556-123.000.

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Lucas, Roger C.; Weatherbee, James A.; and Tsang, Monica L.-S., 4,931,548, Cl. 530-399.000.

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Sibbald, Alastair; Webb, Brian C.; Robins, Ian; Ross, John F.; and Bell, Edward C., 4,931,851, Cl. 357-25.000.

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Heidenreich, Holger; and Wehling, Klaus, 4,931,579, Cl. 558-29.000.

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Koch, Herbert; and Weimar, Peter, 4,930,882, Cl. 350-530.000.

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Franco, Robert S.; and Weiner, Murray, 4,931,276, Cl. 424-533.000.

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Klaus, Michael; Loeliger, Peter; and Weiser, Harald, 4,931,458, Cl. 514-354.000.

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Zsifkovits, Wilhelm; Gruning, Burghard; Kollmeier, Hans-Joachim; Schaefer, Dietmar; and Weitemeyer, Christian, 4,931,362, Cl. 428-402.220.

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Krasnicki, Edward J.; and Margolis, Donald L., 4,930,507, Cl. 128-649.000.

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Blost, Elly; and Welkert, Ute, 4,931,278, Cl. 424-195.100.

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Lang, Gunther; Konrad, Eugen; Wendel, Harald; Maresch, Gerhard; and Lenz, Hans-Rudi, 4,931,271, Cl. 424-47.000.

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Krimmel, Heinz; Muller-Sybrichs, Manfred; Schilling, Rolf; and Weller, Ulrich, 4,931,229, Cl. 264-3.300.

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Eylon, Daniel; Froes, Francis H.; and Welsch, Gerhard, 4,931,253, Cl. 419-25.000.

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Chaur Ching, Lai; and Wen Ho, Huang, 4,930,584, Cl. 173-116.000.

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Krumholz, Frank C.; and Jines, Michael D., 4,930,277, Cl. 52-263.000.

Wentworth, Robert J.: *See*—
Belanger, James A.; Wentworth, Robert J.; Turner, Barry S.; and Astley, Graham J., 4,931,244, Cl. 264-154.000.

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Worrell, Wayne; Weppner, Werner; and Schubert, Helmut, 4,931,214, Cl. 252-520.000.

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Stadtfeld, Hermann, 4,930,950, Cl. 409-27.000.

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Krimmel, Heinz; Muller-Sybricha, Manfred; Schilling, Rolf; and Weller, Ulrich, 4,931,229, Cl. 264-3.300.

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Werts, Stephen D.: *See*—
King, James D.; and Werts, Stephen D., 4,930,408, Cl. 99-407.000.

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Barnard, Michael A.; and Beugelsdyk, Anthony F., 4,930,369, Cl. 74-480.00R.

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Ayers, Alan D.; and Wesner, John A., 4,931,368, Cl. 429-53.000.

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Langenfeld, Joseph W.; and Westendorf, Neal W., 4,930,974, Cl. 414-631.000.

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Asars, Juris A.; and Colbaugh, Michael E., 4,931,684, Cl. 313-3.000.
North, William E.; Entenmann, David T.; and Donlan, John P., 4,930,900, Cl. 415-115.000.

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Syre, Jean-Claude; Westphal, Harald; and Hailperin, Max, 4,931,931, Cl. 364-300.000.

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Rigby, William R., 4,930,639, Cl. 206-621.000.

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Kamprath, Axel; and Weyandt, Johannes, 4,930,469, Cl. 123-195.00C.

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Allen, Jeffrey W.; Beal, Peter R.; and Whinfrey, Dennis R., 4,930,430, Cl. 110-264.000.

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Clay, Roy T., 4,930,561, Cl. 160-229.100.

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Folsom, Mark, 4,930,418, Cl. 102-201.000.

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Foreman, Mark M.; Garbrecht, William L.; Marzoni, Gifford P.; and Whitten, Kathleen R., 4,931,447, Cl. 514-288.000.

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Whyman, Donald G.: *See*—
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Lancour, Jeff J.; Chouinard, Ronald D.; and Wick, Carl J., 4,930,718, Cl. 242-86.50R.

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Carl, Michael J., 4,931,701, Cl. 315-240.000.

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Barbier, Pierre; Schneider, Fernand; and Widmer, Ulrich, 4,931,463, Cl. 514-422.000.

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Adam, Norbert; and Wiedermann, Rolf, 4,931,481, Cl. 521-123.000.
Krippl, Kurt; Schulte, Klaus; Hoffmann, Erwin; and Wiedermann, Rolf, 4,931,480, Cl. 521-99.000.

Wiener, Scott A.: *See*—
Rossman, Phillip J.; and Wiener, Scott A., 4,930,511, Cl. 128-661.030.

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Kersten, Siegfried; Jaeger, Karl-Friedrich; Koenig, Karl-Heinz; Mueller, Albrecht; Pawliczek, Josef B.; Recker, Hans-Gert; Rohr, Wolfgang; and Wigger, August, 4,931,466, Cl. 514-490.000.

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Blume, Ingo; Peinemann, Klaus-Viktor; Pinnau, Ingo; and Wijmans, Johannes G., 4,931,181, Cl. 210-500.270.

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Turin, Paul S.; Wilkes, Robert D., Jr.; and Hakes, Rowe, 4,930,586, Cl. 175-25.000.

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Wilks, Henry A.: *See*—
Monson, Clifford L.; Perry, Danny C.; Domay, Theodor; and Wilks, Henry A., 4,930,178, Cl. 15-320.000.
Willard, Miles J.: *See*—
Holm, David; Hix, Veldon M.; and Willard, Miles J., 4,931,303, Cl. 426-549.000.
Willemin, Albert, to ETA SA Fabriques d'Ebauches. Method of manufacturing an object of thermoplastics material having a decorative design. 4,931,248, Cl. 264-266.000.
Willer, Josef: *See*—
Pausch, Thomas; and Willer, Josef, 4,931,136, Cl. 156-643.000.
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Martin, Malcolm A.; and Willey, Ronald, 4,931,393, Cl. 435-235.000.
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Mahoney, William M., 4,930,903, Cl. 383-6.000.
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Courtright, Steven B.; and Barrett, Kevin F., 4,931,295, Cl. 426-5.000.
Yatka, Robert J.; Patel, Mansukh M.; and Reed, Michael A., 4,931,294, Cl. 426-3.000.
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Khanna, Jai K.; Silvey, Norman G.; and Williams, Charles D., 4,930,978, Cl. 415-58.300.
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Williams, Richard E.; and Slimak, Lewis W., to Numa Corporation. Opaque adapter for overhead projector. 4,930,886, Cl. 353-97.000.
Williams, Robert W.; and Rakic, Pasko, to Yale University. Tissue analyzer. 4,932,044, Cl. 377-10.000.
Williamson, Allan J.: *See*—
Brecht, William B.; Feder, David O.; McAndrews, Joseph M.; and Williamson, Allan J., 4,931,367, Cl. 429-50.000.
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Huisinga, Richard D., 4,930,446, Cl. 119-21.000.
Wills, Kenneth F., to Saunders-Roe Developments Limited. Lighting devices. 4,931,910, Cl. 362-34.000.
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Wilson, Charlie. Device for exercising the mid-body region. 4,930,771, Cl. 272-146.000.
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Wilson, John R. Ballistic stream electrical stunning systems. 4,930,392, Cl. 89-1.110.
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Geyer, Joel Erwin; Lee, Joseph K.; Norman, Vernon R.; and Wilson, Kenneth T., 4,932,023, Cl. 370-85.400.
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Poole, Donald R.; and Wilson, Michael A., 4,931,111, Cl. 149-35.000.
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Shanklin, Gary L.; and Win, Maung H., 4,931,200, Cl. 252-91.000.
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Cameron, Russell J.; Krape, Richard P.; and Winsand, Robert N., 4,930,401, Cl. 91-32.000.
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Hammer, Klaus-Dieter; Winter, Hermann; and Buettner, Rolf, 4,930,545, Cl. 138-118.100.
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Kesel, Bruno; Zink, Gerhard; and Winter, Karin, 4,930,984, Cl. 416-203.000.
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Ellison, Thomas M.; and Winton, Robert A., 4,931,324, Cl. 428-31.000.
Wirth, Hermann O.; and Friedrich, Hans-Helmut, to Ciba-Geigy Corporation. Process for producing glycidyl thioethers. 4,931,576, Cl. 549-514.000.
Wirth, Karl-Ernst: *See*—
Molerus, Otto O.; and Wirth, Karl-Ernst, 4,931,260, Cl. 422-147.000.
Wirz, Arno, to Heidelberger Druckmaschinen AG. Sheet fed rotary printing press for performing alternatively single-side multicolor printing or first form and perfector printing. 4,930,414, Cl. 101-183.000.
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Sih, Charles J., 4,931,399, Cl. 435-280.000.
Wittig, Werner, to Keiper Recaro GmbH & Co. Back-rest adjuster with a free pivot device. 4,930,841, Cl. 297-379.000.
Wittington, George R. Ram air aerial device with lower skin pressure regulator. 4,930,728, Cl. 244-145.000.
Wittman GmbH: *See*—
Aue, Alfred A., 4,931,060, Cl. 606-188.000.
WJM Corporation: *See*—
Macy, David F.; and Alsenz, Evert C., 4,930,351, Cl. 73-505.000.
Woerman, Gary R.: *See*—
Leidecker, Henry A.; and Woerman, Gary R., 4,930,601, Cl. 184-6.120.
Woessner, Michael A.: *See*—
Pearman, A. Noel J.; Hunter, Gerald D.; and Woessner, Michael A., 4,930,488, Cl. 126-39.00E.
Wolf, Anthony D., to Du Pont de Nemours, E. I., and Company. Herbicidal diazoles sulfonamides. 4,931,081, Cl. 71-92.000.
Wolf, Jurgen; Jestadt, Albrecht; Heintke, Hans E.; and Odemer, Michael, to Braun Aktiengesellschaft. Electric shaving apparatus with a shaving head control means. 4,930,217, Cl. 30-43.920.
Wolfrum, Erhard; Faber, Wolfgang; Konig, Reiner; and Sieglen, Rolf A., to Rheinische Braunkohlenwerke AG; Konig, Reiner; and Sieglen, Rolf A. Apparatus for preparing samples from a flow of bulk material. 4,930,359, Cl. 73-863.230.
Wollar, Burnell J.: *See*—
Bart, Joseph; and Wollar, Burnell J., 4,930,279, Cl. 52-466.000.
Woller, Thomas A., to Baker, Knapp & Tubbs, Inc. Cushion element and method for making same. 4,930,173, Cl. 5-481.000.
Wollowitz, Susan: *See*—
Malhotra, Sudarshan K.; Dripps, James E.; Bradfisch, Gregory A.; Wollowitz, Susan; and Knox, Ingrid L., 4,931,452, Cl. 514-344.000.
Wolper, John F., Jr. Highway fencing. 4,930,752, Cl. 256-13.100.
Wood-Mizer Products, Inc.: *See*—
Laskowski, Donald R.; and Tekulve, Daniel R., 4,930,386, Cl. 83-399.000.
Wood, Thomas E.; and Lange, Roger W., to Minnesota Mining and Manufacturing Company. Thermal extractive gelation process. 4,931,414, Cl. 501-103.000.
Wood, Thomas G.; and Xenides, Carol J., to BASF K & F Corporation. Edible, baked compositions containing cholestyramine. 4,931,280, Cl. 424-439.000.
Woodard, Dudley H., to Beryllium Copper Processes L.P. Process for heat treating beryllium copper. 4,931,105, Cl. 148-2.000.
Woodard, Robert W.; Lucht, Eric T.; and Clark, Danny L., to Outboard Marine Corporation. Programmed mechanism for selectively locating swivel bracket relative to transom bracket. 4,930,744, Cl. 248-642.000.
Woodbridge, Trevor: *See*—
Bumpus, John; and Woodbridge, Trevor, 4,931,055, Cl. 606-60.000.
Woodland, Sylvester L. Dynamic screener. 4,930,189, Cl. 17-46.000.
Woodland, Sylvester L. Jet propeller. 4,931,026, Cl. 440-38.000.
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Porter, Eahmal L.; Wozniak, Walter E.; and Garner, Gerald D., 4,930,701, Cl. 239-102.200.
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Hamm, Robert N.; Hunter, Scott R.; Hurst, George S.; Turner, James E.; and Wright, Harvel A., 4,931,653, Cl. 250-385.100.
Wright, Paul B.; and Ward, Mary V., to Imperial Chemeical Industries, plc. Decorating tool. 4,930,179, Cl. 15-230.110.
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Henriksen, William; Katz, Louis; and Wuchinich, David G., 4,930,512, Cl. 128-661.060.
Wunderlich, Blake A., to Antenna Company, The. Window mounted antenna for a cellular mobile telephone. 4,931,806, Cl. 343-715.000.
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Cohen, Donald K.; Ayres, James D.; and Cochran, Eugene R., 4,931,630, Cl. 250-201.300.
Xenides, Carol J.: *See*—
Wood, Thomas G.; and Xenides, Carol J., 4,931,280, Cl. 424-439.000.
Xerox Corporation: *See*—
Garavuso, Gerald M., 4,930,766, Cl. 271-220.000.
Xomox International GmbH & Co.: *See*—
Gonsior, Wolfgang, 4,930,748, Cl. 251-163.000.
Xylem Technologies, Inc.: *See*—
Baum, Charles S., 4,931,124, Cl. 156-245.000.
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Yaginuma, Atsushi: *See*—
Inoue, Yoshio; and Yaginuma, Atsushi, 4,931,485, Cl. 521-154.000.

Yagishita, Shigelu; Sugimoto, Masatoshi; and Okita, Tomoaki, to Nippon Zeon Co., Ltd.; and Toyoda Gosei Co., Ltd. Curable acrylate-type elastomer composition. 4,931,509, Cl. 525-208.000.

Yale University: *See*—
Williams, Robert W.; and Rakic, Pasko, 4,932,044, Cl. 377-10.000.

Yamada, Kiyoharu: *See*—
Sasaki, Takeshi; Takakuwa, Yoshio; Haruna, Takayuki; and Yamada, Kiyoharu, 4,930,380, Cl. 82-117.000.

Yamada, Kunio: *See*—
Kosaka, Yoshiteru; and Yamada, Kunio, 4,931,857, Cl. 358-31.000.

Yamada, Michihiro: *See*—
Kikuda, Shigeru; Yamada, Michihiro; and Miyamoto, Hiroshi, 4,931,668, Cl. 307-443.000.

Yamada, Takahiro, to Matsushita Electric Industrial Co., Ltd. Semiconductor device including a channel stop region. 4,931,850, Cl. 357-23.110.

Yamada, Teruaki; Ukena, Toshiyasu; Akisue, Osamu; Kawai, Kenji; Sano, Yuuji; and Hayashida, Teruki, to Nippon Steel Corporation. Process for producing a cold rolled steel sheet having a good ageing resistance by continuous annealing. 4,931,107, Cl. 148-12.300.

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Fujisawa, Mutsuo; Kameda, Tsutomu; Katsura, Hirofumi; Yamaga, Reiichi; and Ishido, Setsuko, 4,931,096, Cl. 106-35.000.

Yamaguchi, Akihiro: *See*—
Tamai, Shoji; Ohta, Masahiro; Kawashima, Saburo; Iiyama, Katsuaki; Oikawa, Hideaki; and Yamaguchi, Akihiro, 4,931,531, Cl. 528-172.000.

Yamaguchi, Hiroshi: *See*—
Mori, Hideshi; Kato, Hisaki; Miyaoka, Mitsuhiko; and Yamaguchi, Hiroshi, 4,930,303, Cl. 57-328.000.

Yamaguchi, Junji; and Yamasaki, Terumasa, to Asahi Kasei Kogyo Kabushiki Kaisha. Uniform magnetic field generator. 4,931,760, Cl. 335-306.000.

Yamaguchi, Masahiko: *See*—
Kano, Mitsuru; Miyagawa, Kenji; Yamaguchi, Masahiko; and Imaizumi, Eiji, 4,930,877, Cl. 350-339.00[F].

Yamaguchi, Satorou: *See*—
Watanabe, Kenji; Uyama, Tadao; Satomi, Norio; Nishikawa, Masahiro; Yamaguchi, Satorou; and Nakazawa, Ichiro, 4,931,251, Cl. 376-128.000.

Yamaguchi, Satoshi: *See*—
Koshizawa, Toshifumi; Yamaguchi, Satoshi; Yoshimura, Hiroshi; and Iida, Youichi, 4,930,594, Cl. 180-179.000.

Yamaha Corporation: *See*—
Kellogg, Steven L.; and Kellogg, Jack A., 4,930,390, Cl. 84-611.000.
Mizuno, Shigeo, 4,930,778, Cl. 273-73.00D.

Yamaha Hatsudoki Kabushiki: *See*—
Oguri, Kiyohiko; and Ohkawa, Tsuyoshi, 4,930,476, Cl. 123-376.000.

Yamaichi Electric Mfg. Co., Ltd.: *See*—
Matsuoka, Noriyuki; and Kubo, Masaaki, 4,931,020, Cl. 439-72.000.

Yamamoto, Harushige, to Niles Parts Co., Ltd. Device for lifting up and down window glass for vehicle. 4,931,714, Cl. 318-663.000.

Yamamoto, Kaoru; Kitano, Toshiaki; and Sano, Hiroyuki, to Polyplastics Co., Ltd. Process for the preparation of acetal polymer or copolymer. 4,931,535, Cl. 528-230.000.

Yamamoto, Kimihisa: *See*—
Tsuchida, Eishun; Nishide, Hiroyuki; Yamamoto, Kimihisa; and YHoshida, Shu, 4,931,542, Cl. 528-373.000.

Yamamoto, Koichi; and Kyohzuka, Takahiro, to Mazda Motor Corporation. Hydraulic control system for automatic transmission. 4,930,375, Cl. 74-866.000.

Yamamoto, Masao, to Mitsubishi Kasei Corporation; and Scalar Corporation. Image magnifying and pick-up system with lighting light-guide device. 4,930,851, Cl. 350-96.100.

Yamamoto, Osamu: *See*—
Wakui, Hitoshi; Kiyohara, Nobuo; Nishino, Haruo; and Yamamoto, Osamu, 4,931,263, Cl. 423-215.500.

Yamamoto, Rikio: *See*—
Dobashi, Yoshitomi; and Yamamoto, Rikio, 4,931,685, Cl. 313-15.000.

Yamamoto, Tohru; Takeo, Tadashi; Ichinose, Kiyohiro; Ozawa, Syogo; Fujii, Kenji; Fujii, Saburo; Enomoto, Mashayuki; Ishibashi, Ichiro; and Murayama, Junichi, to Honda Giken Kogyo Kabushiki. Method and apparatus for painting object. 4,931,322, Cl. 427-421.000.

Yamamoto, Tokuji, to Kyoritsu Glass Mfg., Co., Ltd.; and Mitsubishi Rayon Engineering Co., Ltd. Water treating agent. 4,931,078, Cl. 71-67.000.

Yamamoto, Yoshio; and Hiraoka, Hiroshi, to Murata Kikai Kabushiki Kaisha. Bobbin transporting system. 4,930,302, Cl. 57-281.000.

Yamamoto, Yuji, to Juki Corporation. Bobbin thread holding device for lock stitch sewing machine cutter. 4,930,432, Cl. 112-292.000.

Yamamoto, Yuri: *See*—
Goh, Atsushi; Endo, Keiji; and Yamamoto, Yuri, 4,931,088, Cl. 71-100.000.

Yamanaka, Schunichiro: *See*—
Kawagishi, Yoji; Narita, Shinichi; Kiriu, Takashi; and Yamanaka, Schunichiro, 4,931,588, Cl. 562-68.000.

Yamanashi, Teruaki; Ozawa, Hiroyuki; Yuasa, Hitoshi; Matsuno, Mitsuo; and Satoh, Tetsuo, to Nippon Oil Co., Ltd. Random copolymer containing derivative of bicyclo [2.2.1] hept-2-ene compound. 4,931,520, Cl. 526-281.000.

Yamane, Daiji: *See*—
Kojima, Kunio; Sakamoto, Noriaki; Deguchi, Toshihisa; and Yamane, Daiji, 4,932,013, Cl. 369-32.000.

Yamano, Shozo, to Nikon Corporation. Focus detecting apparatus. 4,931,822, Cl. 354-402.000.

Yamanoue, Kouichi; Akita, Shigeyuki; Tanaka, Hiroaki; Sugitani, Tatsuo; and Inoue, Hideo, to Nippon Soken, Inc.; and Toyota Jidosha Kabushiki Kaisha. Moving body speed detecting device which produces and detects a magnetic pole on the body surface. 4,931,727, Cl. 324-172.000.

Yamao, Yasuo; and Fujioka, Shigeru, to Kabushiki Kaisha Kyoto Daiichi Kagaku. Analysis implement having an oxygen supplying layer. 4,931,387, Cl. 435-25.000.

Yamasaki, Kazuto: *See*—
Yamazaki, Toshimasa; Miura, Kazuyuki; and Yamasaki, Kazuto, 4,930,798, Cl. 280-261.000.

Yamasaki, Terumasa: *See*—
Yamaguchi, Junji; and Yamasaki, Terumasa, 4,931,760, Cl. 335-306.000.

Yamawaki, Hideki: *See*—
Kimura, Takafumi; Yamawaki, Hideki; Ikeda, Kazuto; and Ihara, Masaru, 4,931,425, Cl. 505-1.000.

Yamazaki, Hiroshi: *See*—
Miya, Shinya; Yoshimura, Takashi; Mise, Takaya; and Yamazaki, Hiroshi, 4,931,417, Cl. 502-117.000.

Yamazaki, Itaru: *See*—
Matsumoto, Masakazu; Ishikawa, Shozo; Ando, Wataru; Kikuchi, Toshihiro; and Yamazaki, Itaru, 4,931,371, Cl. 430-59.000.

Yamazaki, Syuuichi: *See*—
Amaya, Shinji; Iwanari, Yoshiyuki; Shinzo, Kinji; Kogawara, Toshiro; Yamazaki, Syuuichi; Shimizu, Seiichi; and Kuriyama, Kazuya, 4,931,370, Cl. 430-45.000.

Yamazaki, Takashi: *See*—
Fushiya, Fusao; Yamazaki, Takashi; and Saito, Mikio, 4,930,583, Cl. 173-109.000.

Yamazaki, Toshimasa; Miura, Kazuyuki; and Yamasaki, Kazuto, to Maeda Industries, Ltd. Bicycle handle assembly. 4,930,798, Cl. 280-261.000.

Yamazaki, Toshiyuki: *See*—
Nakahama, Ryoji; and Yamazaki, Toshiyuki, 4,931,027, Cl. 440-53.000.

Yanagimoto, Shigeru; and Kondo, Ryoichi, to Showa Denko Kabushiki Kaisha. Method for continuous casting of an aluminum-lithium alloy. 4,930,566, Cl. 164-475.000.

Yanagisawa, Akira. Method for manufacturing fiber from thin plate material. 4,930,199, Cl. 29-4.510.

Yanamoto, Kaoru: *See*—
Taguchi, Keiichi; and Yanamoto, Kaoru, 4,931,888, Cl. 360-77.040.

Yang, Ching-Shi: *See*—
Fredette, Maurice C. J.; and Yang, Ching-Shi, 4,931,268, Cl. 423-479.000.

Yang, Jefferson Y. S.: *See*—
Reinicke, Robert H.; and Yang, Jefferson Y. S., 4,930,746, Cl. 251-129.110.

Yano, Akechi. Roll with a bent shaft. 4,930,202, Cl. 29-116.200.

Yano, Hidetoshi: *See*—
Demizu, Hiromi; Obu, Makoto; Yano, Hidetoshi; Seimiya, Ryubun; and Tarumi, Noriyoshi, 4,930,438, Cl. 118-651.000.

Yargus, Larry D.: *See*—
Mitchell, LaDonne; Yargus, Larry D.; Volk, Leon W.; and Volk, William A., 4,930,900, Cl. 366-168.000.

Yarmchuk, Edward J.: *See*—
Hegde, Suryanarayan G.; Scranton, Robert A.; and Yarmchuk, Edward J., 4,931,887, Cl. 360-75.000.

Yasuda, Hirofumi, to Seiko Epson Corporation. Semiconductor memory device. 4,931,996, Cl. 365-189.090.

Yasukawa, Takeshi: *See*—
Hata, Yasuaki; Yasukawa, Takeshi; and Onishi, Masayoshi, 4,931,728, Cl. 324-207.150.

Yata, Akio; and Aida, Kuniko. Nursing bottles. 4,930,902, Cl. 374-150.000.

Yatka, Robert J.; Patel, Manaukh M.; and Reed, Michael A., to Wm. Wrigley Jr. Company. Environmentally stable chewing gum composition containing xylitol. 4,931,294, Cl. 426-3.000.

Yazaki, Hisashi: *See*—
Anzawa, Norio; Yazaki, Hisashi; Adachi, Kozi; Watanabe, Naoki; Miyabe, Shuichi; and Kitazawa, Kozo, 4,931,108, Cl. 148-18.000.

Yeda Research and Development Company Limited: *See*—
Shamir, Adi, 4,932,056, Cl. 380-23.000.
Shinitzky, Meir; and Cohen, Irun R., 4,931,275, Cl. 424-88.000.

Yee, Loren W., to National Semiconductor corporation. Master slave voltage reference circuit. 4,931,665, Cl. 307-296.600.

Yeh, Chien-Hwa. Fabrication method of a hollow racket made of carbon fiber. 4,931,247, Cl. 264-258.000.

YHoshida, Shu: *See*—
Tsuchida, Eishun; Nishide, Hiroyuki; Yamamoto, Kimihisa; and YHoshida, Shu, 4,931,542, Cl. 528-373.000.

Ying, Wen-Ping: *See*—
Baral, Elliott; Brown, Percy B.; Hauptman, Reuben D.; Jaeger, Richard J., Jr.; LaPorta, Frank C.; Lauber, Pamela J.; LeCronier, Richard E.; Nelson, Randall H.; Russell, Thomas L., Jr.; and Ying, Wen-Ping, 4,932,042, Cl. 379-67.000.

Yiu, Joseph T., to Motorola, Inc. Localized circuit card cooling device. 4,931,904, Cl. 361-384.000.

Yogan, Thomas J.: *See*—
Cullo, Leonard A.; Nagle, Elliott V., Jr.; Restelli, Edward F., Jr.; and Yogan, Thomas J., 4,931,418, Cl. 502-218.000.

Yokogawa Electric Corporation: *See*—
Inou, Kiyoharu; Koide, Yoshiaki; and Iwata, Yasunobu, 4,931,918, Cl. 363-19.000.
Yokono, Hitoshi: *See*—
Kasukabe, Susumu; Ookubo, Masasi; Akiba, Yutaka; Tanaka, Minoru; and Yokono, Hitoshi, 4,931,726, Cl. 324-158.00F.
Yonemasu, Hiro; Shirai, Kiyohide; and Kawamura, Ikunosuke, to Kyocera America, Inc. Low capacitance integrated circuit package. 4,931,854, Cl. 357-74.000.
Yonetani, Tugio: *See*—
Okura, Norio; Okura, Ryoichi; and Yonetani, Tugio, 4,930,613, Cl. 198-365.000.
Yorimoto, Koji: *See*—
Takahashi, Fumitaka; Okazaki, Kunio; Shiraishi, Masaru; Takahashi, Masayuki; Obara, Kazufumi; Yorimoto, Koji; and Tanabe, Tohru, 4,930,349, Cl. 73-497.000.
Yorozu, Shunichi: *See*—
Hayashida, Shinichiro; Okashiro, Hidetoshi; and Yorozu, Shunichi, 4,931,982, Cl. 364-473.000.
Yoshida Industry Co., Ltd.: *See*—
Hatakeyama, Yoshiharu, 4,930,528, Cl. 132-301.000.
Yoshida, Kenichi: *See*—
Obuchi, Masayuki; Oodaira, Hiroshi; and Yoshida, Kenichi, 4,931,853, Cl. 357-74.000.
Yoshida Kogyo K. K.: *See*—
Terada, Yasuharu; Horita, Yoshiyuki; and Ishii, Susumu, 4,930,323, Cl. 70-68.000.
Yoshida, Masahiro: *See*—
Matsuda, Tatsuhito; Funae, Yasuaki; Yoshida, Masahiro; and Takaya, Tsuguo, 4,931,521, Cl. 526-286.000.
Yoshida, Norio, to Ichikoh Industries, Ltd. Mirror drive for automotive remote-controlled rear-view mirror assembly. 4,930,370, Cl. 74-502.100.
Yoshida, Tadao; Fujiie, Kazuhiko; and Ando, Ryo, to Sony Corporation. Apparatus and method of recording and reproducing data using a disk. 4,932,016, Cl. 369-48.000.
Yoshida, Toshiro: *See*—
Takahashi, Yasuyuki; Yoshida, Toshiro; and Takahashi, Takeshi, 4,931,210, Cl. 252-314.000.
Yoshida, Yasuo; Kakinuma, Tadashi; Sakurai, Tadashi; Kishima, Yoshio; and Kinugasa, Hirofumi, to Iwasaki Electric Co., Ltd.; and Dainippon Plastics Co., Ltd. Apparatus for accelerated weather-testing of a sample using a metal halide lamp. 4,931,655, Cl. 250-492.100.
Yoshida, Yoshikazu, to Matsushita Electric Industrial Co., Ltd. Ion source. 4,931,698, Cl. 315-111.810.
Yoshifumi, Murata; Teruhisa, Kaneda; Kazuo, Hara; Katsunori, Takamoto; Isao, Ohonishi; and Shinichi, Yokota, to Kuraray Co., Ltd. Copolyester and polyester resin composition comprising said copolyester. 4,931,538, Cl. 528-292.000.
Yoshihara, Toshiyuki, to Canon Kabushiki Kaisha. Electrophotographic apparatus having abraded surface photosensitive member. 4,931,841, Cl. 355-299.000.
Yoshimi, Yoshiki: *See*—
Shiozawa, Etsuo; Kato, Keishi; and Yoshimi, Yoshiki, 4,931,334, Cl. 428-137.000.
Yoshimoto, Yoshio: *See*—
Kojima, Shinji; Matsukawa, Toshitane; Mizota, Hisakazu; Yuhara, Susumu; Yoshimoto, Yoshio; Fujimura, Toshio; and Ito, Kunihiro, 4,930,207, Cl. 29-527.500.
Yoshimura, Hiroshi: *See*—
Koshizawa, Toshifumi; Yamaguchi, Satoshi; Yoshimura, Hiroshi; and Iida, Youichi, 4,930,594, Cl. 180-179.000.
Yoshimura, Hisashi, to Sharp Kabushiki Kaisha. Ink supply device for ink jet printer. 4,931,814, Cl. 346-140.00R.
Yoshimura, Katsuji: *See*—
Nakayama, Tadayoshi; Sato, Chikara; Nagasawa, Kenichi; Sasatani, Tomohiko; Yoshimura, Katsuji; Takahashi, Koji; and Kozuki, Susumu, 4,932,066, Cl. 382-56.000.
Yoshimura, Takashi: *See*—
Miya, Shinya; Yoshimura, Takashi; Mise, Takaya; and Yamazaki, Hiroshi, 4,931,417, Cl. 502-117.000.
Yoshimura, Yuichiro: *See*—
Kaneko, Kiyoshi; Tanaka, Atsushi; Yoshimura, Yuichiro; Kobayashi, Katsuyuki; and Taniishi, Shinnosuke, 4,931,965, Cl. 364-560.000.
Yoshino, Shigeo: *See*—
Ishimaru, Takeshi; Kishi, Takeshi; and Yoshino, Shigeo, 4,930,743, Cl. 248-638.000.
Yoshino, Tatsuo, to Fuji Photo Film Co., Ltd. Photometer for reproduction machine. 4,931,827, Cl. 355-38.000.
Yoshioka, Hiroshi: *See*—
Kokubu, Takemitsu; and Yoshioka, Hiroshi, 4,931,690, Cl. 313-407.000.
Yoshioka, Hirosuke; Obata, Tokio; Fujii, Katsutoshi; Yoshiya, Haruo; Tsutsumiuchi, Kiyoshi; and Shikita, Shoji, to Ube Industries, Ltd.; and Rikagaku Kenkyusho. Alkylaminopyrimidine derivative and insecticide, acaricide and fungicide containing the same as active ingredient. 4,931,455, Cl. 514-256.000.
Yoshitake, Junichi; Kitani, Hiroaki; Muranaka, Takeshi; Mizuno, Akira; and Kashiwa, Norio, to Mitsui Petrochemical Industries, Ltd. α-olefinic random copolymer and production process thereof. 4,931,526, Cl. 526-336.000.
Yoshitake, Kunitoshi; Tsujita, Yoshihiro; and Kakuta, Nobuyuki, to Mitsubishi Denki Kabushiki Kaisha. Device mounting appliance. 4,930,694, Cl. 224-42.45R.
Yoshitomi Pharmaceutical Industries, Ltd.: *See*—
Nakao, Toru; Morita, Kenji; Obata, Minoru; and Morimoto, Yasuto, 4,931,443, Cl. 514-252.000.
Yoshiya, Haruo: *See*—
Yoshioka, Hirosuke; Obata, Tokio; Fujii, Katsutoshi; Yoshiya, Haruo; Tsutsumiuchi, Kiyoshi; and Shikita, Shoji, 4,931,455, Cl. 514-256.000.
Yoshizako, Mamoru: *See*—
Ohta, Yoshiro; and Yoshizako, Mamoru, 4,931,578, Cl. 556-470.000.
Young, Christopher R.: *See*—
Brahmbhatt, Sudhir R.; and Young, Christopher R., 4,931,013, Cl. 431-10.000.
Young, David E.; Koskie, Earl T., Jr.; and Easton, Andrew R., to Diamant Boart-Stratabit (USA) Inc. Coring tool. 4,930,587, Cl. 175-251.000.
Young, Donald C., to Union Oil Company of California. Plant seed compositions. 4,931,061, Cl. 47-57.600.
Young, Donald C., to Union Oil Company of California. Scarifying plant seeds. 4,931,079, Cl. 71-77.000.
Young, Michael L.: *See*—
Young, Sheldon E.; Young, Michael L.; and Folkens, Jerry D., 4,930,741, Cl. 248-542.000.
Young, Sheldon E.; Young, Michael L.; and Folkens, Jerry D., to Vibro Dynamics Corporation. Power assisted equipment mounting system. 4,930,741, Cl. 248-542.000.
Younger, Rick. Cement cutting blade. 4,930,487, Cl. 125-15.000.
Yu, Simon H., to B. F. Goodrich Company, The. Ethylene oxide/epihalohydrin copolymer antistatic additive for chlorine-containing polymers. 4,931,506, Cl. 525-187.000.
Yuasa, Hitoshi: *See*—
Yamanashi, Teruaki; Ozawa, Hiroyuki; Yuasa, Hitoshi; Matsuno, Mitsuo; and Satoh, Tetsuo, 4,931,520, Cl. 526-281.000.
Yuhara, Susumu: *See*—
Kojima, Shinji; Matsukawa, Toshitane; Mizota, Hisakazu; Yuhara, Susumu; Yoshimoto, Yoshio; Fujimura, Toshio; and Ito, Kunihiro, 4,930,207, Cl. 29-527.500.
Zacsek, Gabor: *See*—
Fogarasi, Gabor; Sivo, Imre; Zacsek, Gabor; and Zakarias, Istvan, 4,931,004, Cl. 425-28.100.
Zaghloul, Amir I.: *See*—
Assal, Francois T.; Evans, John V.; Mahle, Christoph E.; Zaghloul, Amir I.; and Gupta, Ramesh K., 4,931,802, Cl. 342-356.000.
Zakarias, Istvan: *See*—
Fogarasi, Gabor; Sivo, Imre; Zacsek, Gabor; and Zakarias, Istvan, 4,931,004, Cl. 425-28.100.
Zbinden, Fritz. Very high pressure piston pump. 4,930,404, Cl. 92-60.500.
Zedrosser, Ulrich, to Steyr-Daimler-Puch AG. Hand-held firearm provided with a detachable sight. 4,930,241, Cl. 42-100.000.
Zenner, Michael N., to Toro Company, The. Cutting unit cover. 4,930,298, Cl. 56-17.400.
Zhdanov, Konstantin F.: *See*—
Chernyak, Zinovy A.; Tsvetkov, Alexandr A.; Onischenko, Alexandr M.; Kandala, Anatoly I.; Khrapov, Valery G.; Nunuparov, Georgy M.; Slavinsky, Vladimir M.; Geikhman, Isaak L.; Omelchenko, Nikolai P.; Rafalovich, Boris A.; Silaev, Viktor I.; and Zhdanov, Konstantin F., 4,931,638, Cl. 250-253.000.
Zia Technology, Inc.: *See*—
Bottinelli, N. Edward; and Kotraba, Norman L., 4,931,090, Cl. 75-10.160.
Zimmer, Matthew K.: *See*—
Klueh, David R.; Morris, Jack W.; Urdahl, Kent G.; and Zimmer, Matthew K., 4,931,348, Cl. 428-207.000.
Zink, Gerhard: *See*—
Kesel, Bruno; Zink, Gerhard; and Winter, Karin, 4,930,984, Cl. 416-203.000.
Zitta, Heinz, to Siemens Aktiengesellschaft. CMOS voltage reference. 4,931,718, Cl. 323-313.000.
Zia, Christopher G., to Asahi/America, Inc. Double-containment thermoplastic pipe assembly. 4,930,544, Cl. 138-113.000.
Zlotnik, Arnold; Zlotnik, Milton; and Austin, John A., to Surco Products, Inc. Vandal-proof deodorant cabinet. 4,931,258, Cl. 422-124.000.
Zlotnik, Milton: *See*—
Zlotnik, Arnold; Zlotnik, Milton; and Austin, John A., 4,931,258, Cl. 422-124.000.
Zoller, Jon P., to ITT Corporation. Multi-pole switch. 4,931,605, Cl. 200-408.000.
Zommer, Nathan, to IXYS Corporation. High power transistor with voltage, current, power, resistance, and temperature sensing capability. 4,931,844, Cl. 357-23.400.
Zaifkovits, Wilhelm; Gruning, Burghard; Kollmeier, Hans-Joachim; Schaefer, Dietmar; and Weitemeyer, Christian, to F.Joh.Kwizda Gesellschaft m.b.H.; and TH. Goldschmidt AG. Microcapsule and micromatrix bodies and method for their formation. 4,931,362, Cl. 428-402.220.
Zuber, Peter A.: *See*—
Tompkins, E. Neal; Bartholmae, Jack N.; Zuber, Peter A.; and Charles, Kirk W., 4,931,839, Cl. 355-277.000.
Zuiches, Eugene A. Protective cover for hose connectors. 4,930,543, Cl. 138-110.000.
Zwicker, Walter K.: *See*—
de Leeuw, Dagobert M.; Zwicker, Walter K.; and Bhargava, Rameshwar N., 4,931,312, Cl. 427-64.000.
Zwiep, Theodore C.: *See*—
Schofield, Kenneth; Gallmeyer, William W.; and Zwiep, Theodore C., 4,930,742, Cl. 248-475.100.

Zwingel, Dieter; Lochner, Gunther; and Bleickert, Sonke, to Diehl GmbH & Co. Barreled weapon with chemical-electrical hybrid propulsion through regenerative propellant injection. 4,930,394, Cl. 89-7.000.

ZWN Zahnradwerk Neuenstein GmbH & Co.: *See*—
Muller, Erich R.; Schmidt, Gunther; and Hofmeister, Klaus, 4,931,117, Cl. 156-89.000.

Zylstra, Henry J.: *See*—
Glennon, Oliver; and Zylstra, Henry J., 4,931,893, Cl. 361-45.000.

ZymoGenetics, Inc.: *See*—
Kawasaki, Glenn; and Bell, Leslie, 4,931,373, Cl. 435-69.200.

3M Company: *See*—
Calhoun, Clyde D.; and Koskenmaki, David C., 4,931,598, Cl. 174-117.00F.

501 Ocean B.V.: *See*—
van Rooy, Jacob, 4,930,539, Cl. 137-514.000.

501 Sky Climber, Inc.: *See*—
Murrill, William D.; and Rhodes, Mark W., 4,930,598, Cl. 182-63.000.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 5TH DAY OF JUNE, 1990

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Adams Hard-Facing Company, Inc.: *See*—
Edmisson, Delmar D., Re. 33,226, Cl. 111-124.000.

Baba, Takeshi, to Canon Kabushiki Kaisha. Gradient index type single lens. Re. 33,227, Cl. 350-413.000.

Buchtel, Michael E.; and Honda, Ronald T., to Ford Aerospace Corporation. Optical scanning apparatus incorporating counter-rotation of elements about a common axis by a common driving source. Re. 33,228, Cl. 250-203.600.

C.L.I.C. Electronics International, Inc.: *See*—
Schwaber, Jeffrey S., Re. 33,229, Cl. 364-709.010.

Canon Kabushiki Kaisha: *See*—
Baba, Takeshi, Re. 33,227, Cl. 350-413.000.

Edmisson, Delmar D., to Adams Hard-Facing Company, Inc. Blade shank assembly used in a fertilizer applicator assembly. Re. 33,226, Cl. 111-124.000.

Ford Aerospace Corporation: *See*—
Buchtel, Michael E.; and Honda, Ronald T., Re. 33,228, Cl. 250-203.600.

Honda, Ronald T.: *See*—
Buchtel, Michael E.; and Honda, Ronald T., Re. 33,228, Cl. 250-203.600.

Schwaber, Jeffrey S., to C.L.I.C. Electronics International, Inc. Remote display device for a microcomputer with optical communication. Re. 33,229, Cl. 364-709.010.

LIST OF REEXAMINATION PATENTEES

TO WHOM

CERTIFICATES WERE ISSUED

Acoustical Design Incorporated: *See*—
Cunningham, Donald R.; and Sulewsky, James E., B1 4,185,167, Cl. 381-73.100.

Bouchette, Michael P., to James River Corp., The. Antimicrobially active non-woven web used in a wet wiper. B1 4,615,937, 6-5-90, Cl. 428-288.000.

Cunningham, Donald R.; and Sulewsky, James E., to Acoustical Design Incorporated. Sound masking package. B1 4,185,167, 6-5-90, Cl. 381-73.100.

Herman, Daniel F.; and Kruse, Uno, to NL Chemicals, Inc. Opacifying polymeric particles and uses. B1 4,391,928, 6-5-90, Cl. 523-201.000.

Hoopengardner, Merle R., to Jactac, Inc. System for holding carpet in place without stretching. B1 4,557,774, 6-5-90, Cl. 156-71.000.

Irikura, Tsutomu; Koga, Hiroshi; and Murayama, Satoshi, to Kyorin Seiyaku Kabushiki Kaisha. Quinoline carboxylic acid derivatives and process for the preparation. B1 4,398,029, 6-5-90, Cl. 544-463.000.

Jactac, Inc.: *See*—
Hoopengardner, Merle R., B1 4,557,774, Cl. 156-71.000.

James River Corp., The: *See*—
Bouchette, Michael P., B1 4,615,937, Cl. 428-288.000.

Koga, Hiroshi: *See*—
Irikura, Tsutomu; Koga, Hiroshi; and Murayama, Satoshi, B1 4,398,029, Cl. 544-463.000.

Kruse, Uno: *See*—
Herman, Daniel F.; and Kruse, Uno, B1 4,391,928, Cl. 523-201.000.

Kyorin Seiyaku Kabushiki Kaisha: *See*—
Irikura, Tsutomu; Koga, Hiroshi; and Murayama, Satoshi, B1 4,398,029, Cl. 544-463.000.

Murayama, Satoshi: *See*—
Irikura, Tsutomu; Koga, Hiroshi; and Murayama, Satoshi, B1 4,398,029, Cl. 544-463.000.

NL Chemicals, Inc.: *See*—
Herman, Daniel F.; and Kruse, Uno, B1 4,391,928, Cl. 523-201.000.

Sulewsky, James E.: *See*—
Cunningham, Donald R.; and Sulewsky, James E., B1 4,185,167, Cl. 381-73.100.

LIST OF DESIGN PATENTEES

Addy, Donald E.; and Saper, Byron M., to Jason Empire, Inc. Binocular. 308,388, 6-5-90, Cl. D16-133.000.

Airwick Industries, Inc.: *See*—
Hoyt, Earl; and Patel, Manharbhai K., 308,408, Cl. D23-208.000.
Hoyt, Earl; and Patel, Manharbhai K., 308,409, Cl. D23-208.000.

Aldrich, Thomas B., III, to Bristol-Myers Canada Inc. Bottle. 308,333, 6-5-90, Cl. D9-376.000.

Allemann, James G.; and Hildwein, Roger L., to Rain Bird Consumer Products Mfg. Corp. Hose nozzle. 308,411, 6-5-90, Cl. D23-229.000.

Allen, Marshall T. Motorcycle hitch. 308,353, 6-5-90, Cl. D12-162.000.

Aloise, Arthur C.; and Tichy, Edward, to Cooper Instrument Corporation. Thermometer. 308,343, 6-5-90, Cl. D10-54.000.

Ancona, Bruce: *See*—
Ancona, Jane; and Ancona, Bruce, 308,313, Cl. D7-322.000.
Ancona, Jane; and Ancona, Bruce, 308,314, Cl. D7-322.000.
Ancona, Jane; and Ancona, Bruce, 308,315, Cl. D7-322.000.

Ancona, Jane; and Ancona, Bruce, to M. Kamenstein, Inc. Tea kettle. 308,313, 6-5-90, Cl. D7-322.000.

Ancona, Jane; and Ancona, Bruce, to M. Kamenstein, Inc. Tea kettle. 308,314, 6-5-90, Cl. D7-322.000.

Ancona, Jane; and Ancona, Bruce, to M. Kamenstein, Inc. Tea kettle. 308,515, 6-5-90, Cl. D7-322.000.

Arad, Avi: *See*—
Kennedy, Melvin; and Arad, Avi, 308,390, Cl. D17-22.000.

Arnott, Robert J.: *See*—
Bryenton, Earl L.; Hillmer, Eric; and Arnott, Robert J., 308,347, Cl. D10-106.000.

Arrow Fastener Co., Inc.: *See*—
Wingert, Rudolf, 308,323, Cl. D8-49.000.

Ashihara, Kazuhiko, to Sharp Corporation. Data display for computer. 308,363, 6-5-90, Cl. D14-113.000.

Astley, Graham J.: *See*—
Belanger, James A.; Wentworth, Robert J.; Astley, Graham J.; and Turner, Barry S., 308,417, Cl. D23-383.000.

Austin, Arnold S., to Quabaug Corporation. Footwear unit sole. 308,286, 6-5-90, Cl. D2-320.000.

Avia Group International, Inc.: *See*—
Selbiger, Lawrence, 308,280, Cl. D2-314.000.

Babkes, Mitchell H.: *See*—
Fry, H. Dewey; King, Harold E.; Babkes, Mitchell H.; and Baugh, Ben C., 308,351, Cl. D12-13.000.

Badge-A-Minit, Ltd.: *See*—
Munson, Austin H.; and Bullis, Daniel R., Jr., 308,386, Cl. D15-127.000.

Battegazzore, Piero, to Guala S.p.A. Dispenser for a pastry product. 308,329, 6-5-90, Cl. D9-300.000.

Baugh, Ben C.: *See*—
Fry, H. Dewey; King, Harold E.; Babkes, Mitchell H.; and Baugh, Ben C., 308,351, Cl. D12-13.000.

Beasley, Tom, Jr.; Milly, Peter F.; and Tybergein, Michael B., to Data Entry Systems, Inc. Data entry digitizing tablet. 308,364, 6-5-90, Cl D14-114.000.

Belanger, Inc.: *See*—
Belanger, James A.; Wentworth, Robert J.; Astley, Graham J.; and Turner, Barry S., 308,417, Cl. D23-383.000.
Belanger, James A.; Wentworth, Robert J.; Astley, Graham J.; and Turner, Barry S., to Belanger, Inc. Air blower housing. 308,417, 6-5-90, Cl. D23-383.000.
Bergman, Mark W.; and Harris, Daniel L., to Harber, Inc. Airplane-shaped shoelace or drawstring fastener. 308,281, 6-5-90, Cl. D2-316.000.
Bergman, Mark W.; and Harris, Daniel L., to Harber Inc. Circular shoelace or drawstring fastener. 308,282, 6-5-90, Cl. D2-316.000.
Bergman, Mark W.; and Harris, Daniel L., to Harber Inc. Bear-shaped shoelace or drawstring fastener. 308,283, 6-5-90, Cl. D2-316.000.
Bergman, Mark W.; and Harris, Daniel L., to Harber, Inc. Heart-shaped shoelace or drawstring fastener. 308,284, 6-5-90, Cl. D2-316.000.
Bic Corporation: *See*—
Gyllerstrom, Kenneth, 308,427, Cl. D28-46.000.
Blay, Samuel: *See*—
Gersin, Robert P.; Caruso, Ingrid G.; and Blay, Samuel, 308,309, Cl. D6-465.000.
Borden, David M. Lid removal tool. 308,322, 6-5-90, Cl. D8-40.000.
Bourbonnais, Richard, to Polymos Inc. Container. 308,339, 6-5-90, Cl. D9-424.000.
Bradley, John M. Sleeve for the arm of a windscreen wiper. 308,352, 6-5-90, Cl. D12-155.000.
Braun, James W.: *See*—
Lauchnor, John C.; Schnelle, Joseph W.; Braun, James W.; Galloway, Keith R.; and Schenkel, Jack E., 308,359, Cl. D3-123.000.
Bristol-Myers Canada Inc.: *See*—
Aldrich, Thomas B., III, 308,333, Cl. D9-376.000.
Brumbach, Stuart R. Solar powered ventilating fan for welding helmets. 308,416, 6-5-90, Cl. D23-370.000.
Bryenton, Earl L.; Hillmer, Eric; and Arnott, Robert J., to E. L. Bryenton & Associates, Inc. Ultrasonic object detection device. 308,347, 6-5-90, Cl. D10-106.000.
Bulgari, Paulo, to Partecipazioni Bulgari S.p.A. Earring or similar article. 308,349, 6-5-90, Cl. D11-75.000.
Bullis, Daniel R., Jr.: *See*—
Munson, Austin H.; and Bullis, Daniel R., Jr., 308,386, Cl. D15-127.000.
Busto, Rodney J.: *See*—
Russell, Bryan G.; and Busto, Rodney J., 308,410, Cl. D23-209.000.
Cain, Ann S., to 'totes', incorporated. Umbrella handle. 308,288, 6-5-90, Cl. D3-12.000.
Cain, Ann S., to 'totes', incorporated. Umbrella handle. 308,289, 6-5-90, Cl. D3-12.000.
Caruso, Ingrid G.: *See*—
Gersin, Robert P.; Caruso, Ingrid G.; and Blay, Samuel, 308,309, Cl. D6-465.000.
Casablanca Fan Company, Inc.: *See*—
Mason, Jean C., 308,419, Cl. D23-411.000.
CertainTeed Corporation: *See*—
Westphal, Dennis; and Piles, Jonathan, 308,421, Cl. D25-124.000.
Champion Spark Plug Company: *See*—
Dewees, John G.; and Martins, Rickey, 308,434, Cl. D34-25.000.
Chang, Herry. Surfing boat. 308,402, 6-5-90, Cl. D21-237.000.
Chen, Chia-Mo. Key ring. 308,296, 6-5-90, Cl. D3-62.000.
Chromcraft Furniture Corp.: *See*—
Wilson, Robert L., 308,310, Cl. D6-502.000.
Chrysler Corporation: *See*—
Megregian, Richard; Moore, Michael G.; and Ozark, L. John, 308,383, Cl. D14-258.000.
Moore, Michael G.; Straub, Kurt M.; and Mills, Ronald, 308,382, Cl. D14-258.000.
Van Hout, James; Moore, Michael G.; and Slanec, Thomas C., 308,384, Cl. D14-258.000.
Cincinnati Milacron Inc.: *See*—
Lauchnor, John C.; Schnelle, Joseph W.; Braun, James W.; Galloway, Keith R.; and Schenkel, Jack E., 308,359, Cl. D3-123.000.
Cloverline, Inc., The: *See*—
Leopoldi, Norbert, 308,348, Cl. D11-43.000.
Cooper Instrument Corporation: *See*—
Aloise, Arthur C.; and Tichy, Edward, 308,343, Cl. D10-54.000.
Creda Limited: *See*—
Lane, Richard J., 308,418, Cl. D23-395.000.
Data Entry Systems, Inc.: *See*—
Beasley, Tom, Jr.; Milly, Peter F.; and Tybergein, Michael B., 308,364, Cl. D14-114.000.
Dehnert, Ronald J. Automatic telephone dialer base. 308,381, 6-5-90, Cl. D14-245.000.
Delbanco, Kurt B., to Delmey Trading Corp. Combined container with lid. 308,336, 6-5-90, Cl. D9-402.000.
Delmey Trading Corp.: *See*—
Delbanco, Kurt B., 308,336, Cl. D9-402.000.
Dewees, John G.; and Martins, Rickey, to Champion Spark Plug Company. Outdoor display cabinet. 308,434, 6-5-90, Cl. D34-25.000.
Dinelli, Patty J. Reversible doll. 308,401, 6-5-90, Cl. D21-149.000.
Domaine Cellars, Inc.: *See*—
Rubinoff, Ronald R., 308,335, Cl. D9-396.000.
Dordan Manufacturing Company: *See*—
Slavin, Daniel J.; and Kreider, John R., 308,331, Cl. D9-341.000.
Doskocil Manufacturing Company, Inc.: *See*—
VanSkiver, Ralph, 308,429, Cl. D30-109.000.
Dozsa-Farkas, Andras, to Giroflex Entwicklungs AG. Chair. 308,300, 6-5-90, Cl. D6-372.000.
Dozsa-Farkas, Andras, to Giroflex Entwicklungs AG. Chair. 308,301, 6-5-90, Cl. D6-372.000.
Dozsa-Farkas, Andras, to Giroflex Entwicklungs AG. Chair. 308,302, 6-5-90, Cl. D6-379.000.
Dozsa-Farkas, Andras, to Giroflex Entwicklungs AG. Chair. 308,303, 6-5-90, Cl. D6-379.000.
Dozsa-Farkas, Andras, to Giroflex Entwicklungs AG. Chair. 308,304, 6-5-90, Cl. D6-372.000.
Dozsa-Farkas, Andras, to Giroflex Entwicklungs AG. Chair. 308,306, 6-5-90, Cl. D6-379.000.
Drouin, Michel; and Morand, Gilles. Hair ornament. 308,425, 6-5-90, Cl. D28-41.000.
Drouin, Michel; and Morand, Gilles. Hair ornament. 308,426, 6-5-90, Cl. D28-41.000.
Durand, Philippe J. Tumbler or similar article. 308,318, 6-5-90, Cl. D7-523.000.
Durbin, Paul: *See*—
Ilsen, Henry; and Durbin, Paul, 308,340, Cl. D9-425.000.
E. L. Bryenton & Associates, Inc.: *See*—
Bryenton, Earl L.; Hillmer, Eric; and Arnott, Robert J., 308,347, Cl. D10-106.000.
England, David L. Record hanger plaque. 308,350, 6-5-90, Cl. D11-132.000.
Ferri, Giampiero. Toy gun. 308,400, 6-5-90, Cl. D21-146.000.
Forsland, Audre C. Orthopedic cervical pillow. 308,311, 6-5-90, Cl. D6-601.000.
Frantz, Mark G., to Frantz Medical Development Ltd. Compact dump unit for enternal fluid delivery. 308,420, 6-5-90, Cl. D24-17.000.
Frantz Medical Development Ltd.: *See*—
Frantz, Mark G., 308,420, Cl. D24-17.000.
Friedman, Gene, to Margene, Inc. Campaign button. 308,397, 6-5-90, Cl. D20-28.000.
Fry, H. Dewey; King, Harold E.; Babkes, Mitchell H.; and Baugh, Ben C., to Ottawa Truck Company. Cab for fire trucks. 308,351, 6-5-90, Cl. D12-13.000.
Fujii, Yoshito: *See*—
Saito, Tomitaro; Fujii, Yoshito; and Ohtani, Tohru, 308,369, Cl. D14-126.000.
Saito, Tomitaro; Fujii, Yoshito; and Ohtani, Tohru, 308,372, Cl. D14-126.000.
Saito, Tomitaro; Fujii, Yoshito; and Ohtani, Tohru, 308,375, Cl. D14-126.000.
Galipeau, Guy; and Simard, Jean F., to Lumec, Inc. Street-lamp. 308,423, 6-5-90, Cl. D26-67.000.
Galloway, Keith R.: *See*—
Lauchnor, John C.; Schnelle, Joseph W.; Braun, James W.; Galloway, Keith R.; and Schenkel, Jack E., 308,359, Cl. D3-123.000.
Gato, Noriteru, to Sanyo Electric Co., Ltd. Combined tape recorder and radio receiver. 308,379, 6-5-90, Cl. D14-163.000.
Gersin, Robert P.; Caruso, Ingrid G.; and Blay, Samuel, to Robert P. Gersin Associates, Inc. Display stand. 308,309, 6-5-90, Cl. D6-465.000.
Giroflex Entwicklungs AG: *See*—
Dozsa-Farkas, Andras, 308,300, Cl. D6-372.000.
Dozsa-Farkas, Andras, 308,301, Cl. D6-372.000.
Dozsa-Farkas, Andras, 308,302, Cl. D6-379.000.
Dozsa-Farkas, Andras, 308,303, Cl. D6-379.000.
Dozsa-Farkas, Andras, 308,304, Cl. D6-372.000.
Dozsa-Farkas, Andras, 308,306, Cl. D6-379.000.
Gold Star Co., Ltd.: *See*—
Shim, Kue S., 308,380, Cl. D14-218.000.
Goodwin, William J. Child play structure. 308,404, 6-5-90, Cl. D21-240.000.
Gormley, Brian F.; and Takei, Koji, to Joico Laboratories, Inc. Bottle. 308,334, 6-5-90, Cl. D9-395.000.
Great Plains Industries, Inc.: *See*—
Russold, Frank J.; and Laqua, Fred L., 308,385, Cl. D15-7.000.
Greenlee Textron Inc.: *See*—
Lynn, Randy R., 308,328, Cl. D8-356.000.
Guala S.p.A.: *See*—
Battegazzore, Piero, 308,329, Cl. D9-300.000.
Gyllerstrom, Kenneth, to Bic Corporation. Combined razor and blade cover thereof. 308,427, 6-5-90, Cl. D28-46.000.
Hammero, Lars, to Turinova Aktiebolag. House boat. 308,357, 6-5-90, Cl. D12-315.000.
Hara, Kunio; Hiroki, Shin-ichi; and Tani, Atsushi, to Kabushiki Kaisha Toshiba. Electronic copying machine. 308,392, 6-5-90, Cl. D18-38.000.
Harber, Inc.: *See*—
Bergman, Mark W.; and Harris, Daniel L., 308,281, Cl. D2-316.000.
Bergman, Mark W.; and Harris, Daniel L., 308,282, Cl. D2-316.000.
Bergman, Mark W.; and Harris, Daniel L., 308,283, Cl. D2-316.000.
Bergman, Mark W.; and Harris, Daniel L., 308,284, Cl. D2-316.000.
Harris, Daniel L.: *See*—
Bergman, Mark W.; and Harris, Daniel L., 308,281, Cl. D2-316.000.
Bergman, Mark W.; and Harris, Daniel L., 308,282, Cl. D2-316.000.
Bergman, Mark W.; and Harris, Daniel L., 308,283, Cl. D2-316.000.
Bergman, Mark W.; and Harris, Daniel L., 308,284, Cl. D2-316.000.
Hashiba, Takeo: *See*—
Saito, Tomitaro; and Hashiba, Takeo, 308,366, Cl. D14-126.000.
Haworth, Brian D., to S. C. Johnson & Son, Inc. Bottle. 308,332, 6-5-90, Cl. D9-367.000.
Hildwein, Roger L.: *See*—
Allemann, James G.; and Hildwein, Roger L., 308,411, Cl. D23-229.000.

Hillmer, Eric: *See*—
Bryenton, Earl L.; Hillmer, Eric; and Arnott, Robert J., 308,347, Cl. D10-106.000.
Hiroki, Shin-ichi: *See*—
Hara, Kunio; Hiroki, Shin-ichi; and Tani, Atsushi, 308,392, Cl. D18-38.000.
Hokazono, Manabu: *See*—
Sakamoto, Harumi; and Hokazono, Manabu, 308,376, Cl. D14-126.000.
Horn, Donald N.; and Randmae, Rein, to Vicon Industries, Inc. Camera mount. 308,389, 6-5-90, Cl. D16-242.000.
Houghtaling, Verena H. Hanger cover. 308,299, 6-5-90, Cl. D6-328.000.
Hoyt, Earl; and Patel, Manharbhai K., to Airwick Industries, Inc. Toilet bowl deodorant holder. 308,408, 6-5-90, Cl. D23-208.000.
Hoyt, Earl; and Patel, Manharbhai K., to Airwick Industries, Inc. Toilet bowl deodorant holder. 308,409, 6-5-90, Cl. D23-208.000.
I.W. Industries: *See*—
Strignano, Joseph, 308,412, Cl. D23-241.000.
Iida, Katsuhiro: *See*—
Sakaguchi, Hiroshi; and Iida, Katsuhiro, 308,391, Cl. D18-7.000.
Ikemura, Takeshi: *See*—
Nakahara, Michihiro; Saito, Shinji; and Ikemura, Takeshi, 308,367, Cl. D14-126.000.
Ilsen, Henry; and Durbin, Paul, to Strata Products Ltd. Storage container. 308,340, 6-5-90, Cl. D9-425.000.
Ing. C. Olivetti & C., S.p.A.: *See*—
Sottsass, Ettore, 308,362, Cl. D14-113.000.
International Business Machines Corporation: *See*—
Schaum, David L., 308,360, Cl. D14-100.000.
Jason Empire, Inc.: *See*—
Addy, Donald E.; and Saper, Byron M., 308,388, Cl. D16-133.000.
Joico Laboratories, Inc.: *See*—
Gormley, Brian F.; and Takei, Koji, 308,334, Cl. D9-395.000.
Kabushiki Kaisha Toshiba: *See*—
Hara, Kunio; Hiroki, Shin-ichi; and Tani, Atsushi, 308,392, Cl. D18-38.000.
Mikami, Tatsuyuki, 308,368, Cl. D14-126.000.
Nakahara, Michihiro; Saito, Shinji; and Ikemura, Takeshi, 308,367, Cl. D14-126.000.
Shinoda, Masaru; and Mantegazza, Franco, 308,371, Cl. D14-126.000.
Shinoda, Masaru; and Mantegazza, Franco, 308,378, Cl. D14-133.000.
Shiraki, Masazumi, 308,370, Cl. D14-126.000.
Takechi, Kanta, 308,365, Cl. D14-126.000.
Kawaishi, Masayoshi; and Satake, Koji, to Sharp Corporation. Microwave oven. 308,316, 6-5-90, Cl. D7-351.000.
Keller, H. Thomas, to Rosalco, Inc. Armoire. 308,307, 6-5-90, Cl. D6-439.000.
Keller, H. Thomas, to Rosalco, Inc. Vanity table. 308,308, 6-5-90, Cl. D6-444.000.
Kennametal Inc.: *See*—
Valerius, Eugen, 308,387, Cl. D15-130.000.
Kennedy, Melvin; and Arad, Avi. Electronic drum. 308,390, 6-5-90, Cl. D17-22.000.
King, Harold E.: *See*—
Fry, H. Dewey; King, Harold E.; Babkes, Mitchell H.; and Baugh, Ben C., 308,351, Cl. D12-13.000.
King, William L.; and Winter, Roger D., to Samsonite Corporation. Luggage case. 308,298, 6-5-90, Cl. D3-76.000.
Klippel, Aaron J. Skateboard wrench. 308,327, 6-5-90, Cl. D8-105.000.
Kosako, Mikio, to Sharp Corporation. Copier control device. 308,393, 6-5-90, Cl. D18-41.000.
Koziol, Walter, to Moerke Display & Mfg. Co., Inc. Cooking rack. 308,317, 6-5-90, Cl. D7-409.000.
Krassner, Wayne. Key chain. 308,294, 6-5-90, Cl. D3-61.000.
Kreider, John R.: *See*—
Slavin, Daniel J.; and Kreider, John R., 308,331, Cl. D9-341.000.
Kunze, Walter A., to Waterbury Companies, Inc. Environmental control dispenser. 308,415, 6-5-90, Cl. D23-366.000.
LaForce, James W., Jr. Inflatable tanning tub. 308,403, 6-5-90, Cl. D21-237.000.
Lane, Richard J., to Creda Limited. Housing for an electric storage heater. 308,418, 6-5-90, Cl. D23-395.000.
Laqua, Fred L.: *See*—
Russold, Frank J.; and Laqua, Fred L., 308,385, Cl. D15-7.000.
Larami Corporation: *See*—
Raucci, William R., 308,320, Cl. D7-627.000.
Lauchnor, John C.; Schnelle, Joseph W.; Braun, James W.; Galloway, Keith R.; and Schenkel, Jack E., to Cincinnati Milacron Inc. Pendant control housing. 308,359, 6-5-90, Cl. D3-123.000.
Lehmann, Darrell J. Panel mounted fish hook sharpener. 308,325, 6-5-90, Cl. D8-62.000.
Leopoldi, Norbert, to Cloverline, Inc., The. Helically-shaped earring. 308,348, 6-5-90, Cl. D11-43.000.
Longman, John. Carbide scraper. 308,433, 6-5-90, Cl. D32-49.000.
Lui, Chi L. Key holder. 308,292, 6-5-90, Cl. D3-61.000.
Lumec, Inc.: *See*—
Galipeau, Guy; and Simard, Jean F., 308,423, Cl. D26-67.000.
Lynn, Randy R., to Greenlee Textron Inc. Line dispensing cannister for installing a pull-line into a conduit. 308,328, 6-5-90, Cl. D8-356.000.
M. Kamenstein, Inc.: *See*—
Ancona, Jane; and Ancona, Bruce, 308,313, Cl. D7-322.000.
Ancona, Jane; and Ancona, Bruce, 308,314, Cl. D7-322.000.
Ancona, Jane; and Ancona, Bruce, 308,315, Cl. D7-322.000.
Makihara, Kendo, to Sharp Corporation. Combined dehumidifier and air cleaner. 308,414, 6-5-90, Cl. D23-359.000.
Makowsky, Brad. Attachment cover for a portable circular saw. 308,326, 6-5-90, Cl. D8-70.000.
Mantegazza, Franco: *See*—
Shinoda, Masaru; and Mantegazza, Franco, 308,371, Cl. D14-126.000.
Shinoda, Masaru; and Mantegazza, Franco, 308,378, Cl. D14-133.000.
Margene, Inc.: *See*—
Friedman, Gene, 308,397, Cl. D20-28.000.
Marlin, Chester M. Key holder. 308,293, 6-5-90, Cl. D3-61.000.
Martins, Rickey: *See*—
Dewees, John G.; and Martins, Rickey, 308,434, Cl. D34-25.000.
Mason, Jean C., to Casablanca Fan Company, Inc. Cover plate for a ceiling fan. 308,419, 6-5-90, Cl. D23-411.000.
Matoba, Keiko: *See*—
Nakagawa, Takehisa; and Matoba, Keiko, 308,344, Cl. D10-92.000.
Nakagawa, Takehisa; and Matoba, Keiko, 308,345, Cl. D10-92.000.
Nakagawa, Takehisa; Matoba, Keiko; and Nishida, Kouji, 308,346, Cl. D10-94.000.
Matsushita Electric Industrial Co., Ltd.: *See*—
Nakamura, Masakazu; Sugiyama, Yoshihiko; and Yamamoto, Susumu, 308,361, Cl. D14-109.000.
Megregian, Richard; Moore, Michael G.; and Ozark, L. John, to Chrysler Corporation. Control panel for a combined vehicular radio receiver, cassette player, digital clock and graphic equalizer. 308,383, 6-5-90, Cl. D14-258.000.
Mikami, Tatsuyuki, to Kabushiki Kaisha Toshiba. Television receiver. 308,368, 6-5-90, Cl. D14-126.000.
Miller, Darlene M.; and Miller, John A. Seat belt pad. 308,287, 6-5-90, Cl. D2-639.000.
Miller, John A.: *See*—
Miller, Darlene M.; and Miller, John A., 308,287, Cl. D2-639.000.
Mills, Ronald: *See*—
Moore, Michael G.; Straub, Kurt M.; and Mills, Ronald, 308,382, Cl. D14-258.000.
Milly, Peter F.: *See*—
Beasley, Tom, Jr.; Milly, Peter F.; and Tybergein, Michael B., 308,364, Cl. D14-114.000.
Moerke Display & Mfg. Co., Inc.: *See*—
Koziol, Walter, 308,317, Cl. D7-409.000.
Moore, Barry B. Towline depressor. 308,358, 6-5-90, Cl. D12-317.000.
Moore, Michael G.; Straub, Kurt M.; and Mills, Ronald, to Chrysler Corporation. Control panel for a compact disk player. 308,382, 6-5-90, Cl. D14-258.000.
Moore, Michael G.: *See*—
Megregian, Richard; Moore, Michael G.; and Ozark, L. John, 308,383, Cl. D14-258.000.
Van Hout, James; Moore, Michael G.; and Slanec, Thomas C., 308,384, Cl. D14-258.000.
Morand, Gilles: *See*—
Drouin, Michel; and Morand, Gilles, 308,425, Cl. D28-41.000.
Drouin, Michel; and Morand, Gilles, 308,426, Cl. D28-41.000.
Mori, Eugene Y. Display sign for automobile windows. 308,399, 6-5-90, Cl. D20-35.000.
Mori, Gian L. Writing instrument. 308,395, 6-5-90, Cl. D19-42.000.
Mulvaney, Thomas W., to Spectrum Innovations, Inc. Fishing rod carrier. 308,290, 6-5-90, Cl. D3-38.000.
Munson, Austin H.; and Bullis, Daniel R., Jr., to Badge-A-Minit, Ltd. Circle cutting machine. 308,386, 6-5-90, Cl. D15-127.000.
Nakagawa, Takehisa; and Matoba, Keiko, to Sharp Corporation. Scale. 308,344, 6-5-90, Cl. D10-92.000.
Nakagawa, Takehisa; and Matoba, Keiko, to Sharp Corporation. Scale. 308,345, 6-5-90, Cl. D10-92.000.
Nakagawa, Takehisa; Matoba, Keiko; and Nishida, Kouji, to Sharp Corporation. Remote controller for scale. 308,346, 6-5-90, Cl. D10-94.000.
Nakahara, Michihiro; Saito, Shinji; and Ikemura, Takeshi, to Kabushiki Kaisha Toshiba. Pocket television receiver. 308,367, 6-5-90, Cl. D14-126.000.
Nakamura, Masakazu; Sugiyama, Yoshihiko; and Yamamoto, Susumu, to Matsushita Electric Industrial Co., Ltd. Optical memory disk drive. 308,361, 6-5-90, Cl. D14-109.000.
Nihon Radiator Co., Ltd.: *See*—
Takamatsu, Yoshikazu, 308,407, Cl. D23-205.000.
Nishida, Kouji, to Sharp Corporation. Desk lamp. 308,424, 6-5-90, Cl. D26-107.000.
Nishida, Kouji: *See*—
Nakagawa, Takehisa; Matoba, Keiko; and Nishida, Kouji, 308,346, Cl. D10-94.000.
Ohtani, Tohru: *See*—
Saito, Tomitaro; Fujii, Yoshito; and Ohtani, Tohru, 308,369, Cl. D14-126.000.
Saito, Tomitaro; Fujii, Yoshito; and Ohtani, Tohru, 308,372, Cl. D14-126.000.
Saito, Tomitaro; and Ohtani, Tohru, 308,374, Cl. D14-126.000.
Saito, Tomitaro; Fujii, Yoshito; and Ohtani, Tohru, 308,375, Cl. D14-126.000.
Oliver, Daniel A., to Stanley-Bostitch, Inc. Pocket stapler. 308,324, 6-5-90, Cl. D8-50.000.
O'Neal, William T. Security wallet. 308,291, 6-5-90, Cl. D3-56.000.
O'Shea, Terence K. Splash guard for cleaning paint rollers. 308,430, 6-5-90, Cl. D32-35.000.

Ottawa Truck Company: *See*—
Fry, H. Dewey; King, Harold E.; Bakkes, Mitchell H.; and Baugh, Ben C., 308,351, Cl. D12-13.000.
Owens-Illinois Glass Container Inc.: *See*—
Weckman, Richard L., 308,337, Cl. D9-404.000.
Ozark, L. John: *See*—
Megregian, Richard; Moore, Michael G.; and Ozark, L. John, 308,383, Cl. D14-258.000.
Paccar Inc.: *See*—
Sasamura, Ross, 308,422, Cl. D26-35.000.
Partecipazioni Bulgari S.p.A.: *See*—
Bulgari, Paolo, 308,349, Cl. D11-75.000.
Patel, Manharbhai K.: *See*—
Hoyt, Earl; and Patel, Manharbhai K., 308,408, Cl. D23-208.000.
Hoyt, Earl; and Patel, Manharbhai K., 308,409, Cl. D23-208.000.
Patrinicola, Samuel C. Mold for fish filet. 308,312, 6-5-90, Cl. D7-676.000.
Pentel Kabushiki Kaisha: *See*—
Sekiguchi, Shungo, 308,396, Cl. D19-49.000.
Pfizer, Inc.: *See*—
Sarica, Dominick A., 308,428, Cl. D28-76.000.
Phelps, Pamela; and White, Roberta. Wall hamper. 308,431, 6-5-90, Cl. D32-37.000.
Phelps, Pamela: *See*—
White, Roberta; and Phelps, Pamela, 308,432, Cl. D32-37.000.
Piles, Jonathan: *See*—
Westphal, Dennis; and Piles, Jonathan, 308,421, Cl. D25-124.000.
Polymos Inc.: *See*—
Bourbonnais, Richard, 308,339, Cl. D9-424.000.
Prince, Jack H. Bottle opener. 308,321, 6-5-90, Cl. D8-33.000.
Quabaug Corporation: *See*—
Austin, Arnold S., 308,286, Cl. D2-320.000.
Rain Bird Consumer Products Mfg. Corp.: *See*—
Allemann, James G.; and Hildwein, Roger L., 308,411, Cl. D23-229.000.
Randmae, Rein: *See*—
Horn, Donald N.; and Randmae, Rein, 308,389, Cl. D16-242.000.
Raucci, William R., to Larami Corporation. Football lunchbox. 308,320, 6-5-90, Cl. D7-627.000.
Reckitt & Colman Products, Limited: *See*—
Teece, Ivor, 308,330, Cl. D9-338.000.
Reebok International Ltd.: *See*—
Serna, Ralph, 308,285, Cl. D2-320.000.
Robbins, Richard J., to Zebco Corporation. Baitcast fishing reel. 308,406, 6-5-90, Cl. D22-140.000.
Robert P. Gersin Associates, Inc.: *See*—
Gersin, Robert P.; Caruso, Ingrid G.; and Blay, Samuel, 308,309, Cl. D6-465.000.
Romano, Frank J. Combined key holder and self defense weapon. 308,297, 6-5-90, Cl. D3-62.000.
Rosalco, Inc.: *See*—
Keller, H. Thomas, 308,307, Cl. D6-439.000.
Keller, H. Thomas, 308,308, Cl. D6-444.000.
Rubinoff, Ronald R., to Domaine Cellars, Inc. Bottle. 308,335, 6-5-90, Cl. D9-396.000.
Russell, Bryan G.; and Busto, Rodney J., to Vu-Flow Filters Company. Combined filter unit and coupling element. 308,410, 6-5-90, Cl. D23-209.000.
Russold, Frank J.; and Laqua, Fred L., to Great Plains Industries, Inc. Pump assembly for high-viscosity liquid products. 308,385, 6-5-90, Cl. D15-7.000.
S. C. Johnson & Son, Inc.: *See*—
Haworth, Brian D., 308,332, Cl. D9-367.000.
Saito, Shinji: *See*—
Nakahara, Michihiro; Saito, Shinji; and Ikemura, Takeshi, 308,367, Cl. D14-126.000.
Saito, Tomitaro; and Hashiba, Takeo, to Sharp Corporation. Television set. 308,366, 6-5-90, Cl. D14-126.000.
Saito, Tomitaro; Fujii, Yoshito; and Ohtani, Tohru, to Sharp Corporation. Television set. 308,369, 6-5-90, Cl. D14-126.000.
Saito, Tomitaro; Fujii, Yoshito; and Ohtani, Tohru, to Sharp Corporation. Television set. 308,372, 6-5-90, Cl. D14-126.000.
Saito, Tomitaro; and Ohtani, Tohru, to Sharp Corporation. Television set. 308,374, 6-5-90, Cl. D14-126.000.
Saito, Tomitaro; Fujii, Yoshito; and Ohtani, Tohru, to Sharp Corporation. Television set. 308,375, 6-5-90, Cl. D14-126.000.
Saito, Tomitaro; and Sakamoto, Harumi, to Sharp Corporation. Television set. 308,377, 6-5-90, Cl. D14-126.000.
Sakaguchi, Hiroshi; and Iida, Katsuhiro, to Sharp Corporation. Electronic calculator. 308,391, 6-5-90, Cl. D18-7.000.
Sakamoto, Harumi; and Hokazono, Manabu, to Sharp Corporation. Television set. 308,376, 6-5-90, Cl. D14-126.000.
Sakamoto, Harumi: *See*—
Saito, Tomitaro; and Sakamoto, Harumi, 308,377, Cl. D14-126.000.
Samsonite Corporation: *See*—
King, William L.; and Winter, Roger D., 308,298, Cl. D3-76.000.
Sanyo Electric Co., Ltd.: *See*—
Gato, Noriteru, 308,379, Cl. D14-163.000.
Saper, Byron M.: *See*—
Addy, Donald E.; and Saper, Byron M., 308,388, Cl. D16-133.000.
Sarica, Dominick A., to Pfizer, Inc. Cosmetic case. 308,428, 6-5-90, Cl. D28-76.000.
Sartz, Frank. Sign. 308,398, 6-5-90, Cl. D20-31.000.
Sasamura, Ross, to Paccar Inc. Headlight for a truck. 308,422, 6-5-90, Cl. D26-35.000.
Satake, Koji: *See*—
Kawaishi, Masayoshi; and Satake, Koji, 308,316, Cl. D7-351.000.
Schaum, David L., to International Business Machines Corporation. Information entry keyboard or the like. 308,360, 6-5-90, Cl. D14-100.000.
Schenkel, Jack E.: *See*—
Lauchnor, John C.; Schnelle, Joseph W.; Braun, James W.; Galloway, Keith R.; and Schenkel, Jack E., 308,359, Cl. D3-123.000.
Schnelle, Joseph W.: *See*—
Lauchnor, John C.; Schnelle, Joseph W.; Braun, James W.; Galloway, Keith R.; and Schenkel, Jack E., 308,359, Cl. D3-123.000.
Sekiguchi, Shungo, to Pentel Kabushiki Kaisha. Writing instrument. 308,396, 6-5-90, Cl. D19-49.000.
Selbiger, Lawrence, to Avia Group International, Inc. Shoe upper. 308,280, 6-5-90, Cl. D2-314.000.
Serna, Ralph, to Reebok International Ltd. Shoe sole. 308,285, 6-5-90, Cl. D2-320.000.
Sharp Corporation: *See*—
Ashihara, Kazuhiko, 308,363, Cl. D14-113.000.
Kawaishi, Masayoshi; and Satake, Koji, 308,316, Cl. D7-351.000.
Kosako, Mikio, 308,393, Cl. D18-41.000.
Makihara, Kendo, 308,414, Cl. D23-359.000.
Nakagawa, Takehisa; and Matoba, Keiko, 308,344, Cl. D10-92.000.
Nakagawa, Takehisa; and Matoba, Keiko, 308,345, Cl. D10-92.000.
Nakagawa, Takehisa; Matoba, Keiko; and Nishida, Kouji, 308,346, Cl. D10-94.000.
Nishida, Kouji, 308,424, Cl. D26-107.000.
Saito, Tomitaro; and Hashiba, Takeo, 308,366, Cl. D14-126.000.
Saito, Tomitaro; Fujii, Yoshito; and Ohtani, Tohru, 308,369, Cl. D14-126.000.
Saito, Tomitaro; Fujii, Yoshito; and Ohtani, Tohru, 308,372, Cl. D14-126.000.
Saito, Tomitaro; and Ohtani, Tohru, 308,374, Cl. D14-126.000.
Saito, Tomitaro; Fujii, Yoshito; and Ohtani, Tohru, 308,375, Cl. D14-126.000.
Saito, Tomitaro; and Sakamoto, Harumi, 308,377, Cl. D14-126.000.
Sakaguchi, Hiroshi; and Iida, Katsuhiro, 308,391, Cl. D18-7.000.
Sakamoto, Harumi; and Hokazono, Manabu, 308,376, Cl. D14-126.000.
Shimizu, Osamu, 308,373, Cl. D14-126.000.
Sherlin, Steven D. Separable key ring. 308,295, 6-5-90, Cl. D3-61.000.
Shim, Kue S., to Gold Star Co., Ltd. Remote controller. 308,380, 6-5-90, Cl. D14-218.000.
Shimizu, Osamu, to Sharp Corporation. Television set. 308,373, 6-5-90, Cl. D14-126.000.
Shinoda, Masaru; and Mantegazza, Franco, to Kabushiki Kaisha Toshiba. Television receiver. 308,371, 6-5-90, Cl. D14-126.000.
Shinoda, Masaru; and Mantegazza, Franco, to Kabushiki Kaisha Toshiba. Television receiver. 308,378, 6-5-90, Cl. D14-133.000.
Shiraki, Masazumi, to Kabushiki Kaisha Toshiba. Television receiver. 308,370, 6-5-90, Cl. D14-126.000.
Simard, Jean F.: *See*—
Galipeau, Guy; and Simard, Jean F., 308,423, Cl. D26-67.000.
Slanec, Thomas C.: *See*—
Van Hout, James; Moore, Michael G.; and Slanec, Thomas C., 308,384, Cl. D14-258.000.
Slavin, Daniel J.; and Kreider, John R., to Dordan Manufacturing Company. Recloasable package. 308,331, 6-5-90, Cl. D9-341.000.
Smith, Henry D. Shelf divider. 308,394, 6-5-90, Cl. D19-34.100.
Snodgrass, Warren H. Chair. 308,305, 6-5-90, Cl. D6-379.000.
Sottsass, Ettore, to Ing. C. Olivetti & C., S.p.A. Display. 308,362, 6-5-90, Cl. D14-113.000.
Spaggiari, Alessandro, to Spal S.R.L. Portable cooler. 308,319, 6-5-90, Cl. D7-605.000.
Spal S.R.L.: *See*—
Spaggiari, Alessandro, 308,319, Cl. D7-605.000.
Spectrum Innovations, Inc.: *See*—
Mulvaney, Thomas W., 308,290, Cl. D3-38.000.
Spoto, Stuart C. Portable sun visor. 308,355, 6-5-90, Cl. D12-191.000.
Stanley-Bostitch, Inc.: *See*—
Oliver, Daniel A., 308,324, Cl. D8-50.000.
Strahan, Ronald L. Combination step and boot cleaner. 308,356, 6-5-90, Cl. D12-203.000.
Strata Products Ltd.: *See*—
Ilsen, Henry; and Durbin, Paul, 308,340, Cl. D9-425.000.
Straub, Kurt M.: *See*—
Moore, Michael G.; Straub, Kurt M.; and Mills, Ronald, 308,382, Cl. D14-258.000.
Strignano, Joseph, to I.W. Industries. Faucet. 308,412, 6-5-90, Cl. D23-241.000.
Sugiyama, Yoshihiko: *See*—
Nakamura, Masakazu; Sugiyama, Yoshihiko; and Yamamoto, Susumu, 308,361, Cl. D14-109.000.
Takamatsu, Yoshikazu, to Nihon Radiator Co., Ltd. Liquid tank for use in the cooling cycle of an air conditioning device or the like. 308,407, 6-5-90, Cl. D23-205.000.
Takechi, Kanta, to Kabushiki Kaisha Toshiba. Television receiver. 308,365, 6-5-90, Cl. D14-126.000.
Takei, Koji: *See*—
Gormley, Brian F.; and Takei, Koji, 308,334, Cl. D9-395.000.
Tani, Atsushi: *See*—
Hara, Kunio; Hiroki, Shin-ichi; and Tani, Atsushi, 308,392, Cl. D18-38.000.
Tasca International Ltd.: *See*—
Yoshiharu, Takei, 308,342, Cl. D10-22.000.

Teece, Ivor, to Reckitt & Colman Products, Limited. Combined container and applicator. 308,330, 6-5-90, Cl. D9-338.000.
Thomas, Grady, Jr. Mud flap brace. 308,354, 6-5-90, Cl. D12-185.000.
Tichy, Edward: *See*—
Aloise, Arthur C.; and Tichy, Edward, 308,343, Cl. D10-54.000.
'totes', incorporated: *See*—
Cain, Ann S., 308,288, Cl. D3-12.000.
Cain, Ann S., 308,289, Cl. D3-12.000.
Turinova Aktiebolag: *See*—
Hammero, Lars, 308,357, Cl. D12-315.000.
Turner, Barry S.: *See*—
Belanger, James A.; Wentworth, Robert J.; Astley, Graham J.; and Turner, Barry S., 308,417, Cl. D23-383.000.
Tybergein, Michael B.: *See*—
Beasley, Tom, Jr.; Milly, Peter F.; and Tybergein, Michael B., 308,364, Cl. D14-114.000.
Universal Consolidated Methods, Inc.: *See*—
Yoder, Ronald L., 308,405, Cl. D22-134.000.
Valerius, Eugen, to Kennametal Inc. Cutting tool insert. 308,387, 6-5-90, Cl. D15-130.000.
Van Hout, James; Moore, Michael G.; and Slanec, Thomas C., to Chrysler Corporation. Control panel for a combined vehicular radio receiver and cassette player. 308,384, 6-5-90, Cl. D14-258.000.
VanSkiver, Ralph, to Doskocil Manufacturing Company, Inc. Portable pet carrier. 308,429, 6-5-90, Cl. D30-109.000.
Vicon Industries, Inc.: *See*—
Horn, Donald N.; and Randmae, Rein, 308,389, Cl. D16-242.000.
Vu-Flow Filters Company: *See*—
Russell, Bryan G.; and Busto, Rodney J., 308,410, Cl. D23-209.000.
Waterbury Companies, Inc.: *See*—
Kunze, Walter A., 308,415, Cl. D23-366.000.
Weckman, Richard L., to Owens-Illinois Glass Container Inc. Bottle. 308,337, 6-5-90, Cl. D9-404.000.
Well Men Industrial Co. Ltd.: *See*—
Wong, Man K., 308,413, Cl. D23-356.000.
Wentworth, Robert J.: *See*—
Belanger, James A.; Wentworth, Robert J.; Astley, Graham J.; and Turner, Barry S., 308,417, Cl. D23-383.000.
Westphal, Dennis; and Piles, Jonathan, to CertainTeed Corporation. Window component extrusion. 308,421, 6-5-90, Cl. D25-124.000.
White, Roberta; and Phelps, Pamela. Wall hamper. 308,432, 6-5-90, Cl. D32-37.000.
White, Roberta: *See*—
Phelps, Pamela; and White, Roberta, 308,431, Cl. D32-37.000.
Wilson, Robert L., to Chromcraft Furniture Corp. Seating unit. 308,310, 6-5-90, Cl. D6-502.000.
Wingert, Rudolf, to Arrow Fastener Co., Inc. Staple gun. 308,323, 6-5-90, Cl. D8-49.000.
Winter, Roger D.: *See*—
King, William L.; and Winter, Roger D., 308,298, Cl. D3-76.000.
Winterling, Stig. Blank for package or the like. 308,341, 6-5-90, Cl. D9-433.000.
Wong, Man K., to Well Men Industrial Co. Ltd. Combined humidifier and fan heater unit. 308,413, 6-5-90, Cl. D23-356.000.
Yamamoto, Susumu: *See*—
Nakamura, Masakazu; Sugiyama, Yoshihiko; and Yamamoto, Susumu, 308,361, Cl. D14-109.000.
Yeh, Jen Z. Display and shipping container. 308,338, 6-5-90, Cl. D9-415.000.
Yoder, Ronald L., to Universal Consolidated Methods, Inc. Downrigger mounting bracket. 308,405, 6-5-90, Cl. D22-134.000.
Yoshiharu, Takei, to Tasca International Ltd. Clock. 308,342, 6-5-90, Cl. D10-22.000.
Zeboo Corporation: *See*—
Robbins, Richard J., 308,406, Cl. D22-140.000.

LIST OF PLANT PATENTEES

Barberet-Maiolino, Nicole; and Blanc, Henri, to Laboratoire de Physiologie Vegetale. Spray carnation named Longpol. 7,242, 6-5-90, Cl. 70.000.

Blanc, Henri: *See*—
Barberet-Maiolino, Nicole; and Blanc, Henri, 7,242, Cl. 70.000.

Drewlow, Lyndon W., to Mikkelsens, Inc. Impatiens plant named Antares. 7,241, 6-5-90, Cl. 68.000.

Laboratoire de Physiologie Vegetale: *See*—
Barberet-Maiolino, Nicole; and Blanc, Henri, 7,242, Cl. 70.000.

Mikkelsens, Inc.: *See*—
Drewlow, Lyndon W., 7,241, Cl. 68.000.

Rey, Bruce, to Warren & Son Nursery. Elm tree named Golden Rey Elm. 7,240, 6-5-90, Cl. 51.000.

VandenBerg, Cornelis P., to Yoder Brothers, Inc. Chrysanthemum plant named Dana. 7,243, 6-5-90, Cl. 74.000.

Warren & Son Nursery: *See*—
Rey, Bruce, 7,240, Cl. 51.000.

Yoder Brothers, Inc.: *See*—
VandenBerg, Cornelis P., 7,243, Cl. 74.000.

LIST OF STATUTORY INVENTION REGISTRATIONS

APPLICANTS TO WHOM

STATUTORY INVENTION REGISTRATIONS WERE ISSUED ON THE 5TH DAY OF JUNE, 1990

Adolph, Horst G.; and Nock, Lori A., to United States of America, Navy. Copolyformals of 1,2-bis(2-hydroxyethyl)-1,2-dicarbadodecaborane(12) and polyfluoroalkyl diols. H784, 6-5-90, Cl. 528-241.000.

Adolph, Horst G.; and Nock, Lori A., to United States of America, Navy. Copolyformals of 1,2-bis(2-hydroxyethyl)-1,2-dicarbadodecaborane and polynitroalkyl diols. H786, 6-5-90, Cl. 528-4.000.

Callender, Alan B., to United States of America, Army. Telescope with improved mirror support. H783, 6-5-90, Cl. 350-620.000.

Collignon, Steven L., to United States of America, Navy. Carbohydrazinium dinitrate. H787, 6-5-90, Cl. 149-36.000.

Davis, Richard M.: *See*—
Sanval, Probal K.; and Davis, Richard M., H792, Cl. 342-17.000.

Fuji Photo Film Co., Ltd.: *See*—
Ueda, Shinji; Sakanoue, Kei; Ichijima, Seiji; and Kobayashi, Hidetoshi, H789, Cl. 430-372.000.

Gergen, William P.; Lutz, Robert G.; and Willis, Carl L. Modified block copolymers. H790, 6-5-90, Cl. 525-314.000.

Ichijima, Seiji: *See*—
Ueda, Shinji; Sakanoue, Kei; Ichijima, Seiji; and Kobayashi, Hidetoshi, H789, Cl. 430-372.000.

Kageyama, Shigeki: *See*—
Katsuyama, Harumi; Kageyama, Shigeki; and Nagatomo, Shigeru, H791, Cl. 422-56.000.

Katsuyama, Harumi; Kageyama, Shigeki; and Nagatomo, Shigeru. Multilayer analytical element for quantitative analysis of bilirubin. H791, 6-5-90, Cl. 422-56.000.

Kobayashi, Hidetoshi: *See*—
Ueda, Shinji; Sakanoue, Kei; Ichijima, Seiji; and Kobayashi, Hidetoshi, H789, Cl. 430-372.000.

Lutz, Robert G.: *See*—
Gergen, William P.; Lutz, Robert G.; and Willis, Carl L., H790, Cl. 525-314.000.

Merritt, Mike. Decontamination apparatus and method. H785, 6-5-90, Cl. 55-97.000.

Nagatomo, Shigeru: *See*—
Katsuyama, Harumi; Kageyama, Shigeki; and Nagatomo, Shigeru, H791, Cl. 422-56.000.

Nock, Lori A.: *See*—
Adolph, Horst G.; and Nock, Lori A., H784, Cl. 528-241.000.
Adolph, Horst G.; and Nock, Lori A., H786, Cl. 528-4.000.

Sakanoue, Kei: *See*—
Ueda, Shinji; Sakanoue, Kei; Ichijima, Seiji; and Kobayashi, Hidetoshi, H789, Cl. 430-372.000.

Sanval, Probal K.; and Davis, Richard M., to United States of America, Army. Mainlobe canceller with motion compensation for use with radar systems. H792, 6-5-90, Cl. 342-17.000.

Schneider, Clayton J., Jr., to United States of America, Air Force. Method for bonding plastic to metal. H788, 6-5-90, Cl. 156-634.000.

Ueda, Shinji; Sakanoue, Kei; Ichijima, Seiji; and Kobayashi, Hidetoshi, to Fuji Photo Film Co., Ltd. Method for processing a silver halide photographic material. H789, 6-5-90, Cl. 430-372.000.

United States of America
Air Force: *See*—
Schneider, Clayton J., Jr., H788, Cl. 156-634.000.
Army: *See*—
Callender, Alan B., H783, Cl. 350-620.000.
Sanval, Probal K.; and Davis, Richard M., H792, Cl. 342-17.000.
Navy: *See*—
Adolph, Horst G.; and Nock, Lori A., H784, Cl. 528-241.000.
Adolph, Horst G.; and Nock, Lori A., H786, Cl. 528-4.000.
Collignon, Steven L., H787, Cl. 149-36.000.

Willis, Carl L.: *See*—
Gergen, William P.; Lutz, Robert G.; and Willis, Carl L., H790, Cl. 525-314.000.

CLASSIFICATION OF PATENTS

ISSUED JUNE 5, 1990

NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 2

114 4,930,161
161 A 4,930,162
444 4,930,163

CLASS 4

199 4,930,164
235 4,930,165
253 4,930,166
420 4,930,167
489 4,930,168
559 4,930,169

CLASS 5

12 R 4,930,170
450 4,930,171
451 4,930,172
454 4,930,174
481 4,930,173

CLASS 8

94.23 4,931,062
137 4,931,063
149.1 4,931,064
188 4,931,065
410 4,931,066
657 4,931,067

CLASS 12

142 R 4,930,175

CLASS 15

4 4,930,176
105 4,930,177
230.11 4,930,179
250.42 4,930,180
320 4,930,178

CLASS 16

110 R 4,930,181
198 4,930,182
260 4,930,183
273 4,930,184
325 4,930,185
4,930,186

CLASS 17

11 4,930,187
44.3 4,930,188
46 4,930,189

CLASS 19

105 4,930,190

CLASS 24

20 R 4,930,191
4,930,192
129 R 4,930,193
573.5 4,930,194
636 4,930,195
715.3 4,930,196

CLASS 27

2 4,930,197

CLASS 28

257 4,930,198

CLASS 29

4.51 4,930,199
25.42 4,930,200
116.2 4,930,202
243.5 4,930,203
419.2 4,930,204
450 4,930,205
525.2 4,930,206
527.5 4,930,207
568 4,930,208
592.1 4,930,209
597 4,930,210
598 4,930,201
623.5 4,930,211
788 4,930,212
793 4,930,213
830 4,930,214
4,930,215
854 4,930,216
897.35 4,930,329

CLASS 30

43.92 4,930,217
162 4,930,218
230 4,930,219
339 4,930,220

CLASS 33

302 4,930,223
355 D 4,930,224
526 4,930,225
655 4,930,226
755 4,930,227
788 4,930,228
811 4,930,221

CLASS 34

34 4,930,229
168 4,930,230

CLASS 36

30 A 4,930,231
44 4,930,232
117 4,930,233

CLASS 40

1.5 4,930,234
152 4,930,235
414 4,930,236
617 4,930,237

CLASS 42

16 4,930,238
42.01 4,930,239
95 4,930,240
100 4,930,241
105 4,930,242

CLASS 43

17 4,930,243
17.2 4,930,244
42.17 4,930,245
42.28 4,930,246
42.31 4,930,247
43.16 4,930,248
4,930,249
57.3 4,930,250
107 4,930,251

CLASS 47

40.5 4,930,252
57.6 4,931,061
65 4,930,253

CLASS 49

63 4,930,255
181 4,930,254
209 4,930,256
504 4,930,257

CLASS 51

5 R 4,930,258
89 4,930,259
103 TF 4,930,260
105 VG 4,930,261
165.71 4,930,263
165.74 4,930,262
170 T 4,930,264
288 4,930,265
293 4,930,266
4,931,068
4,931,069
392 4,930,267

CLASS 52

79.1 4,930,273
90 4,930,268
125.5 4,930,269
126.1 4,930,270
155 4,930,271
169.5 4,930,272
177 4,930,286
200 4,930,274
4,930,275
211 4,930,276
263 4,930,277
315 4,930,278
403 4,930,280
466 4,930,279
514 4,930,281
551 4,930,282
611 4,930,283
704 4,930,284
743 4,930,285
748 4,930,287

CLASS 53

251 4,930,289
329 4,930,288
456 4,930,290
458 4,930,291
588 4,930,292
590 4,930,293

CLASS 55

16 4,931,070
25 4,931,071
87 4,931,072
96 4,931,073
180 4,930,294

CLASS 56

10.9 4,930,295
11.3 4,930,296
16.6 4,930,297
16.7 4,930,300
17.4 4,930,298
30 4,930,299

CLASS 57

80 4,930,301
281 4,930,302
328 4,930,303

CLASS 59

80 4,930,304

CLASS 60

39.06 4,930,305
39.36 4,930,306
226.1 4,930,307
262 4,930,308
267 4,930,309
271 4,930,310
406 4,930,311
442 4,930,312
454 4,930,313
517 4,930,314
600 4,930,315
641.5 4,930,316

CLASS 62

3.3 4,930,317
51.1 4,930,318
69 4,930,319
184 4,930,320
249 4,930,321
271 4,930,322

CLASS 64

519 4,931,955

CLASS 65

1 4,931,075
4.2 4,931,076
31 4,931,077

CLASS 70

18 4,930,324
68 4,930,323
209 4,930,325

CLASS 71

67 4,931,078
77 4,931,079
87 4,931,080
92 4,931,081
4,931,082
4,931,083
4,931,084
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93 4,931,086
4,931,087
100 4,931,088
121 4,931,089

CLASS 72

35 4,930,326
148 4,930,327
208 4,930,328
348 4,930,330
396 4,930,331
446 4,930,332
447 4,930,333
448 4,930,334
451 4,930,335
453.13 4,930,336
458 4,930,337
479 4,930,338
482 4,930,339

CLASS 73

1 J 4,930,340
37 4,930,341
45.4 4,930,345
49.3 4,930,342
4,930,344
59 4,930,346
189 4,930,347
196 4,930,343
472 4,930,348
497 4,930,349
505 4,930,351
597 4,930,350
662 4,930,352
727 4,930,353
823 4,930,354
840 4,930,355
861.08 4,930,356
861.19 4,930,357
861.28 4,930,358
863.23 4,930,359
864.34 4,930,360
864.62 4,930,361
865.3 4,930,362
865.7 4,930,363
865.8 4,930,364

CLASS 74

5.6 A 4,930,365
365 4,930,366
416 4,930,367
475 4,930,368
480 R 4,930,369
502.1 4,930,370
527 4,930,371
866 4,930,374
4,930,375
867 4,930,376

CLASS 75

10.16 4,931,090
244 4,931,092
680 4,931,091

CLASS 81

15.2 4,930,377
121.1 4,930,378

CLASS 82

101 4,930,379
117 4,930,380
163 4,930,381

CLASS 83

13 4,930,382
27 4,930,383
54 4,930,384
399 4,930,386
508.3 4,930,387

CLASS 84

183 4,930,388
293 4,930,389
611 4,930,390

CLASS 89

1.1 4,930,391
1.11 4,930,392
1.51 4,930,398
1.814 4,930,393
7 4,930,394
8 4,930,395
14.3 4,930,396
4,930,397
34 4,930,400
191.02 4,930,399

CLASS 91

32 4,930,401
167 R 4,930,402
443 4,930,403

CLASS 92

60.5 4,930,404
128 4,930,405
144 4,930,406

CLASS 98

2.01 4,930,407

CLASS 99

407 4,930,408
484 4,930,409

CLASS 100

3 4,930,410
4 4,930,411

CLASS 101

126 4,930,413
183 4,930,414
228 4,930,415
364 4,930,416
465 4,930,417

CLASS 102

201 4,930,418
207 4,930,419
374 4,930,420
377 4,930,421
378 4,930,422
440 4,930,423

CLASS 104

172.3 4,930,424
172.4 4,930,425

CLASS 105

355 4,930,426
406.1 4,930,427

CLASS 106

19 4,931,093
20 4,931,094
22 4,931,095
35 4,931,096
163.1 4,931,100
638 4,931,098
640 4,930,428
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775 4,931,099

CLASS 110

229 4,930,429
264 4,930,430

CLASS 111

124 Re.33,226
164 4,930,431

CLASS 112

292 4,930,432

CLASS 114

61 4,930,433
164 4,930,434
191 4,930,435

CLASS 116

264 4,930,436

CLASS 118

410 4,930,437
651 4,930,438
663 4,930,440
669 4,930,441
723 4,930,439
4,930,442

CLASS 119

1 4,930,443
3 4,930,444
19 4,930,445
21 4,930,446
27 4,930,447
29 4,930,448
60 4,930,449
103 4,930,450
106 4,930,451
148 4,930,452
158 4,930,453

CLASS 122

4 D 4,930,454

CLASS 123

41.1 4,930,455
41.12 4,930,457
4,930,458
41.15 4,930,459
52 M 4,930,461
73 AD 4,930,462
90.11 4,930,463
90.12 4,930,464
4,930,465
179 BG 4,930,466
179 P 4,930,467
188 M 4,930,468
195 C 4,930,469
195 R 4,930,470
196 R 4,930,471
198 E 4,930,472
266 4,930,473
300 4,930,474
339 4,930,475
376 4,930,476
422 4,930,477
425 4,930,478
436 4,930,479
440 4,930,480
481 4,930,481
488 4,930,482
538 4,930,483
546 4,930,484
572 4,930,456

CLASS 124

91 4,930,485

CLASS 125

11.01 4,930,486
15 4,930,487

CLASS 126

39 E 4,930,488
41 R 4,930,489
92 R 4,930,490
332 4,930,491
420 4,930,492
438 4,930,493

CLASS 127

60 4,931,101

CLASS 128

4 4,930,494
10 4,930,495
24 A 4,930,496
25 R 4,930,497
30.2 4,930,498
78 4,930,499
156 4,930,500
204.25 4,930,501
395 4,930,504
398 4,930,505
633 4,930,506
649 4,930,507
653 4,930,509
653 A 4,930,508
654 4,930,510
661.03 4,930,511
661.06 4,930,512
661.09 4,930,513
4,930,514
662.06 4,930,515
665 4,930,516
671 4,930,517
4,930,518
4,930,519
746 4,930,520
786 4,930,521
844 4,930,522
845 4,930,523
876 4,930,524
898 4,930,525

CLASS 131

290 4,930,526

CLASS 132

73 4,930,529
201 4,930,527
301 4,930,528

CLASS 134

2 4,931,102
4,931,103
6 4,930,530
40 4,931,104
167 R 4,930,531
184 4,930,532

CLASS 135

20 R 4,930,533
102 4,930,534

CLASS 137

15 4,930,535
70 4,930,536
265 4,930,537
269 4,930,538
312 4,930,549
334 4,930,550
337 4,930,551
362 4,930,552
508 4,930,553
514 4,930,539
599.1 4,930,540

875 4,930,541

CLASS 138

98 4,930,542
110 4,930,543
113 4,930,544
118.1 4,930,545
149 4,930,546
171 4,930,547

CLASS 140

93.4 4,930,548

CLASS 141

97 4,930,554
98 4,930,555

CLASS 144

347 4,930,556

CLASS 148

2 4,931,105
12 C 4,931,106
12.3 4,931,107
18 4,931,108
248 4,931,074
249 4,931,109

CLASS 149

2 4,931,110
35 4,931,111
88 4,931,112

CLASS 150

166 4,930,557

CLASS 152

339.1 4,930,558
531 4,930,559
554 4,930,560

CLASS 156

64 4,931,113
71 B1 4,557,774
73.1 4,931,114
4,931,115
85 4,931,116
89 4,931,117
138 4,931,118
153 4,931,120
173 4,931,119
213 4,931,121
215 4,931,122
234 4,931,123
245 4,931,124
272.8 4,931,125
304.6 4,931,126
361 4,931,127
362 4,931,128
435 4,931,129
446 4,931,130
556 4,931,131
601 4,931,132
621 4,931,133
630 4,931,134
643 4,931,135
4,931,136
656 4,931,137
659.1 4,931,138

CLASS 160

229.1 4,930,561
236 4,930,562
271 4,930,563

CLASS 162

100 4,931,139
193 4,931,140
255 4,931,141
358 4,931,142
360.1 4,931,143

CLASS 164

169 4,930,564
463 4,930,565
475 4,930,566

CLASS 165

10 4,930,569
25 4,930,567
45 4,930,572
76 4,930,568
104.14 4,930,570
111 4,930,571

CLASS 166

120 4,930,573
266 4,930,574
295 4,930,575
308 4,930,576
387 4,930,577

CLASS 169

39 4,930,578
54 4,930,579

CLASS 172

6 4,930,581
15 4,930,580

788 4,930,582

CLASS 173

109 4,930,583
116 4,930,584

CLASS 174

48 4,931,597
117 F 4,931,598
262 4,931,144

CLASS 175

25 4,930,586
220 4,930,585
251 4,930,587

CLASS 177

212 4,930,588

CLASS 180

19.1 4,930,589
55 4,930,590
65.1 4,930,591
79.1 4,930,592
89.17 4,930,593
179 4,930,594

CLASS 181

104 4,930,595
152 4,930,596
256 4,930,597

CLASS 182

63 4,930,598
103 4,930,599

CLASS 184

3.2 4,930,600
6.12 4,930,601
106 4,930,602

CLASS 187

125 4,930,603
133 4,930,604

CLASS 188

2 D 4,930,605
218 XL 4,930,606

CLASS 192

1.33 4,930,607
3.29 4,930,608
4 A 4,930,609
7 4,930,610
139 4,930,611

CLASS 193

35 SS 4,930,612

CLASS 198

328 4,930,622
346.2 4,930,614
365 4,930,613
411 4,930,615
463.6 4,930,616
465.1 4,930,623
692 4,930,617
781 4,930,618
803.01 4,930,620
803.2 4,930,619
831 4,930,621
835 4,930,624
839 4,930,625

CLASS 200

11 B 4,931,599
43.08 4,931,600
83 N 4,931,601
144 R 4,931,602
4,931,603
406 4,931,604
408 4,931,605
517 4,931,606
524 4,931,607

CLASS 203

69 4,931,145
92 4,931,146

CLASS 204

5 4,931,147
15 4,931,148
4,931,149
4,931,150
26 4,931,152
38.5 4,931,153
39 4,931,154
59 R 4,931,155
72 4,931,156
147 4,931,157
181.7 4,931,158
192.29 4,931,159
208 4,931,166
212 4,931,168
284 4,931,169
298.11 4,931,160
301 4,931,151
376 4,931,172
418

CLASS 206

3 4,930,626
45.23 4,930,627
4,930,628
185 4,930,629
347 4,930,630
366 4,930,631
386 4,930,632
428 4,930,633
454 4,930,634
495 4,930,635
503 4,930,636
541 4,930,637
581 4,930,638
621 4,930,639

CLASS 208

13 4,931,161
41 4,931,162
44 4,931,163
48 AA 4,931,164
100 4,931,165
262.5 4,931,167
348 4,931,170
409 4,931,171

CLASS 209

138 4,931,173
139.1 4,931,174

CLASS 210

86 4,931,175
179 4,931,176
228 4,931,177
4,931,178
331 4,931,179
414 4,931,180
500.27 4,931,181
500.39 4,931,182
614 4,931,183
635 4,931,184
636 4,931,185
4,931,186
662 4,931,187
697 4,931,188
700 4,931,189
710 4,931,190
725 4,931,191
751 4,931,192
768 4,931,193

CLASS 211

41 4,930,640
70.6 4,930,641
71 4,930,642
188 4,930,643

CLASS 215

1 C 4,930,644
11.1 4,930,645
232 4,930,646
252 4,930,647

CLASS 219

10.491 4,931,610
10.55 B 4,931,609
10.55 F 4,931,608
56.22 4,931,611
60 R 4,931,612
68 4,931,613
69.12 4,931,614
121.67 4,931,615
121.68 4,931,616
125.1 4,931,617
216 4,931,618
270 4,931,619
463 4,931,620
467 4,931,621
497 4,931,624
528 4,931,625
540 4,931,626
548 4,931,627

CLASS 220

1 B 4,930,648
1 T 4,930,649
21 4,930,650
23.4 4,930,653
88 A 4,930,651
90.2 4,930,652
235 4,930,657
253 4,930,654
258 4,930,655
269 4,930,658
276 4,930,656
367 4,930,659
4,930,660
465 4,930,661

CLASS 221

45 4,930,662
75 4,930,663

CLASS 222

1 4,930,664
28 4,930,665
181 4,930,666
189 4,930,667
212 4,930,668
309 4,930,669
321 4,930,670
325 4,930,684
370 4,930,685
394 4,930,686
475.1 4,930,687
484 4,930,688
487 4,930,689
490 4,930,690
630 4,930,691

CLASS 223

66 4,930,693
85 4,930,692

CLASS 224

42.45 R 4,930,694
4,930,696
257 4,930,695
275 4,930,697
319 4,930,671

CLASS 225

106 4,930,385

CLASS 226

119 4,930,672

CLASS 227

10 4,930,673
178 4,930,503
179 4,930,674

CLASS 228

112 4,930,675
115 4,930,676
120 4,930,677
176 4,930,678
212 4,930,679

CLASS 229

110 4,930,680
114 4,930,681
123.3 4,930,682
125.09 4,930,683

CLASS 235

454 4,931,628
487 4,931,622
488 4,931,623
4,931,629

CLASS 236

49.3 4,930,698

CLASS 239

102.1 4,930,699
102.2 4,930,700
4,930,701
157 4,930,702
424 4,930,703
579 4,930,704
590.5 4,930,705
754 4,930,706

CLASS 241

5 4,930,707
65 4,930,708
282.2 4,930,709
294 4,930,710

CLASS 242

56 R 4,930,711
58.6 4,930,713
71.8 4,930,714
74 4,930,712
83 4,930,715
85 4,930,716
86 4,930,717
86.5 A 4,930,719
86.5 R 4,930,718
198 4,930,720
200 4,930,721
245 4,930,722
4,930,723

CLASS 244

13 4,930,724
53 R 4,930,725
90 R 4,930,726
145 4,930,727
4,930,728
200 4,930,729
224 4,930,730
316 4,930,731

CLASS 248

56 4,930,733
62 4,930,732
97 4,930,734
101 4,930,735
205.1 4,930,738
220.2 4,930,739
309.1 4,930,740
430 4,930,736
475.1 4,930,742
542 4,930,741
638 4,930,743
642 4,930,744

CLASS 250

201.3 4,931,630
203.6 Re.33,228
221 4,931,631
223 B 4,931,632
223 R 4,931,633
225 4,931,634
4,931,635
226 4,931,636
235 4,931,637
253 4,931,638
282 4,931,639
291 4,931,640
327.2 4,931,641
4,931,642
4,931,643
4,931,644
361 R 4,931,645
367 4,931,646
368 4,931,647
370.10 4,931,648
385.1 4,931,653
390.07 4,931,649
397 4,931,650
436 4,931,654
484.1 4,931,651
4,931,652
492.1 4,931,655
551 4,931,656
559 4,931,657
560 4,931,658
571 4,931,659
575 4,931,660
578.1 4,931,661

CLASS 251

1.1 4,930,745
129.11 4,930,746
129.17 4,930,747
163 4,930,748

CLASS 252

8.551 4,931,194
8.8 4,931,195
47.5 4,931,196
56 R 4,931,197
62.51 4,931,198
68 4,931,199
91 4,931,200
4,931,201
99 4,931,202
4,931,203
167 4,931,204
174.21 4,931,205
180 4,931,206
187.26 4,931,207
299.61 4,931,208
299.63 4,931,209
314 4,931,210
378 R 4,931,211
502 4,931,212
507 4,931,213
520 4,931,214
546 4,931,215
547 4,931,216
4,931,217
551 4,931,218
586 4,931,219
4,931,220
4,931,221
628 4,931,222
700 4,931,223

CLASS 254

10.5 4,930,751
28 4,930,749
89 H 4,930,750

CLASS 256

13.1 4,930,752
26 4,930,753
65 4,930,754

CLASS 261

30 4,931,224
41.5 4,931,226
76 4,931,225

CLASS 264

1.9 4,931,227
2.6 4,931,228
3.3 4,931,229
6 4,931,230
13 4,931,231
28 4,931,232
29.2 4,931,233
40.1 4,931,234
4,931,235
41 4,931,236
48 4,931,237
62 4,931,238
63 4,931,239
81 4,931,240
86 4,931,241
87 4,931,242
109 4,931,243
154 4,931,244
161 4,931,245
241 4,931,246
258 4,931,247
266 4,931,248
279.1 4,931,249

CLASS 266

44 4,930,755
49 4,930,756
270 4,930,757

CLASS 269

54.5 4,930,759
99 4,930,760
292 4,930,758

CLASS 270

53 4,930,761

CLASS 271

11 4,930,762
31 4,930,763
119 4,930,764
214 4,930,765
220 4,930,766

CLASS 272

96 4,930,767
117 4,930,768
120 4,930,769
129 4,930,770
146 4,930,771

CLASS 273

26 A 4,930,774
26 B 4,930,772
26 R 4,930,773
37 4,930,775
58 B 4,930,776
65 EC 4,930,777
73 D 4,930,778
4,930,782
144 B 4,930,779
146 4,930,780
164 4,930,783
167 F 4,930,781
178 B 4,930,784
183 D 4,930,785
186 A 4,930,787
186 C 4,930,786
248 4,930,788
256 4,930,789

CLASS 277

12 4,930,790
151 4,930,791
235 B 4,930,792

CLASS 279

61 4,930,793

CLASS 280

11.28 4,930,794
33.992 4,930,795
87.021 4,930,796
166 4,930,797
261 4,930,798
400 4,930,799
446.1 4,930,800
481 4,930,801
625 4,930,802
668 4,930,803
690 4,930,804
4,930,805
701 4,930,806
707 4,930,807
751 4,930,808
789 4,930,809
821 4,930,810
834 4,930,811

CLASS 281

5 4,930,812

CLASS 283

39 4,930,813
109 4,930,814

CLASS 285

158 4,930,815
189 4,930,817
321 4,930,816

CLASS 290

42 4,931,662
48 4,931,663

CLASS 292

29 4,930,818
42 4,930,819
204 4,930,820
228 4,930,821
357 4,930,822

CLASS 293
107 4,930,823

CLASS 294
19.1 4,930,824
50.9 4,930,825
68.27 4,930,826
81.56 4,930,827
82.15 4,930,828
87.2 4,930,829
88 4,930,830

CLASS 296
26 4,930,831
37.12 4,930,737
50 4,930,834
102 4,930,835
107 4,930,832
136 4,930,833
146 4,930,836
165 4,930,837

CLASS 297
184 4,930,838
338 4,930,839
353 4,930,840
379 4,930,841
466 4,930,842

CLASS 301
63 PW 4,930,843
4,930,844

CLASS 303
100 4,930,845
111 4,930,846

CLASS 307
10.3 4,931,664
296.6 4,931,665
315 4,931,666
443 4,931,667
4,931,668
448 4,931,669
4,931,670
465 4,931,671
475 4,931,672
4,931,673
529 4,931,674
530 4,931,675
571 4,931,676

CLASS 310
12 4,931,677
62 4,931,678
71 4,931,679
83 4,931,680
89 4,931,681
4,931,682
4,931,683

CLASS 313
3 4,931,684
15 4,931,685
141 4,931,686
231.01 4,931,687
336 4,931,688
402 4,931,689
407 4,931,690
417 4,931,691
503 4,931,692
528 4,931,693

CLASS 315
3.5 4,931,694
5.39 4,931,695
61 4,931,696
77 4,931,697
111.81 4,931,698
4,931,700
240 4,931,701
276 4,931,699
344 4,931,702
370 4,931,703
384 4,931,704

CLASS 318
49 4,931,705
282 4,931,706
293 4,931,707
466 4,931,708
567 4,931,709
568.13 4,931,711
625 4,931,712
632 4,931,713
663 4,931,710
4,931,714
709 4,931,715
809 4,932,069

CLASS 323
285 4,931,716
299 4,931,717
313 4,931,718
368 4,931,719

CLASS 324
103 P 4,931,724
142 4,931,725
158 F 4,931,726
172 4,931,727
207.15 4,931,728
209 4,931,729
4,931,730
216 4,931,731
228 4,931,732
318 4,931,733
4,931,734
4,931,735
367 4,931,736
431 4,931,737
435 4,931,738
452 4,931,739
457 4,931,740
525 4,931,741
541 4,931,742
627 4,931,720
658 4,931,721

CLASS 328
167 4,931,743
235 4,931,744

CLASS 330
9 4,931,745
254 4,931,746
286 4,931,747

CLASS 331
1 A 4,931,748
4 4,931,749
111 4,931,750

CLASS 332
108 4,931,751

CLASS 333
151 4,931,752
161 4,931,753
184 4,931,754
193 4,931,755
252 4,931,756

CLASS 335
131 4,931,757
174 4,931,758
301 4,931,759
306 4,931,760

CLASS 336
160 4,931,761

CLASS 337
66 4,931,762

CLASS 338
22 SD 4,931,763
185 4,931,764

CLASS 340
332 4,931,766
407 4,931,765
425.5 4,931,767
473 4,931,768
541 4,931,769
4,931,770
556 4,931,771
573 4,931,772
4,931,773
603 4,931,774
604 4,931,775
610 4,931,776
613 4,931,777
664 4,931,778
674 4,931,779
691 4,931,780
703 4,931,785
706 4,931,781
4,931,782
710 4,931,783
728 4,931,784
755 4,931,786
784 4,931,787
825.500 4,931,791
825.54 4,931,788
825.56 4,931,789
825.64 4,931,790
870.19 4,931,792
903 4,931,793

CLASS 341
31 4,931,794
135 4,931,795
154 4,931,796
162 4,931,797

CLASS 342
4 4,931,798
110 4,931,799
162 4,931,800
185 4,931,801
356 4,931,802
371 4,931,803

CLASS 343
715 4,931,805
4,931,806
745 4,931,807
753 4,931,808
882 4,931,809

CLASS 346
1.1 4,931,810
93 4,931,804
140 A 4,931,812
140 R 4,931,811
4,931,813
4,931,814
154 4,931,815

CLASS 380
3.6 4,930,847
3.7 4,930,868
6.6 4,930,848
4,930,849
6.8 4,930,850
4,930,869
96.10 4,930,851
4,930,852
96.14 4,930,853
96.17 4,930,854
96.19 4,930,855
96.2 4,930,856
96.20 4,930,857
4,930,858
96.21 4,930,859
96.23 4,930,860
96.25 4,930,861
96.29 4,930,862
96.32 4,930,863
97 4,930,870
167 4,930,864
169 4,930,865
243 4,930,871
286 4,930,867
320 4,930,866
321 4,930,872
333 4,930,874
4,930,875
336 4,930,876
339 F 4,930,877
354 4,930,873
394 4,930,878
409 4,930,879
413 Re.33,227
4,930,880
445 4,930,881
530 4,930,882
574 4,930,883
624 4,930,884

CLASS 351
156 4,930,885

CLASS 353
97 4,930,886

CLASS 354
64 4,931,816
113 4,931,817
222 4,931,818
275 4,931,819
402 4,931,820
4,931,821
4,931,822
412 4,931,823
484 4,931,824

CLASS 355
20 4,931,825
28 4,931,826
38 4,931,827
45 4,931,828
68 4,931,829
71 4,931,830
75 4,931,831
77 4,931,832
4,932,068
85 4,931,833
200 4,931,834
203 4,931,835
233 4,931,836
245 4,931,837
260 4,931,838
277 4,931,839
298 4,931,840
299 4,931,841
317 4,931,842

CLASS 356
152 4,930,887
4,930,888
237 4,930,889
241 4,930,890
326 4,930,891
328 4,930,892
344 4,930,893
351 4,930,894
356 4,930,895
376 4,930,896

CLASS 357
23.11 4,931,850
23.4 4,931,844
4,931,846
4,931,848
23.5 4,931,847
23.6 4,931,849
25 4,931,851
71 4,931,845
72 4,931,852
74 4,931,853
4,931,854

CLASS 358
12 4,931,855
29 4,931,856
31 4,931,857
37 4,931,858
60 4,931,859
75 4,931,860
4,931,861
4,931,862
78 4,931,863
80 4,931,864
84 4,931,865
93 4,931,866
98 4,931,867
105 4,931,868
133 4,931,869
142 4,931,870
4,931,871
183 4,931,872
213.11 4,931,873
231 4,931,874
300 4,931,875
4,931,876
335 4,931,877
4,931,878
4,931,879
453 4,931,880
466 4,931,881
474 4,931,882

CLASS 360
11.1 4,931,883
26 4,931,884
48 4,931,885
55 4,931,886
75 4,931,887
77.04 4,931,888
78.07 4,931,889
93 4,931,890
99.06 4,931,891
113 4,931,892

CLASS 361
45 4,931,893
4,931,894
56 4,931,895
73 4,931,896
308 4,931,899
313 4,931,897
315 4,931,900
321 4,931,901
323 4,931,843
354 4,931,902
359 4,931,903
361 4,931,898
384 4,931,904
385 4,931,905
386 4,931,906
391 4,931,907
395 4,931,908
399 4,931,909
535 4,931,961

CLASS 362
34 4,931,910
61 4,931,912
95 4,931,911
103 4,931,913
265 4,931,914
267 4,931,915
272 4,931,916
371 4,931,917

CLASS 363
19 4,931,918
37 4,931,919
82 4,931,920
163 4,931,921

CLASS 364
152 4,931,938
200 4,931,922
4,931,923
4,931,924
4,931,925
300 4,931,927
4,931,928
4,931,931
401 4,931,929
407 4,931,932
409 4,931,933
419 4,931,926
4,931,934
4,931,935
4,931,936
424.01 4,931,930
426.04 4,931,937
431.03 4,931,939
437 4,931,940
459 4,931,941
464.02 4,931,942
468 4,931,943
473 4,931,944
477 4,931,982
490 4,931,945
492 4,931,946
497 4,931,947
505 4,931,949
513 4,931,948
4,931,950
517 4,931,951
518 4,931,952
519 4,931,953
521 4,931,954
4,931,960
525 4,931,956
550 4,931,957
551.01 4,931,958
559 4,931,963
560 4,931,964
565 4,931,965
570 4,931,966
571.01 4,931,975
571.02 4,931,967
571.04 4,931,968
581 4,931,976
708 4,931,977
709.01 4,931,978
709.15 Re.33,229
715.08 4,931,969
724.13 4,931,970
724.16 4,931,971
736 4,931,972
745 4,931,973
750.5 4,931,974
784 4,931,979
900 4,931,980
4,931,981
4,931,983
4,931,984
4,931,985
4,931,986
4,931,987
4,931,988
4,931,989

CLASS 365
1 4,931,990
52 4,931,991
189.01 4,931,993
4,931,994
189.05 4,931,995
189.09 4,931,996
189.11 4,931,992
218 4,931,997
230.01 4,931,998
4,931,999
230.06 4,932,000
233.5 4,932,001
241 4,932,002

CLASS 366
98 4,930,897
4,930,899
109 4,930,898
168 4,930,900

CLASS 367
75 4,932,003
76 4,932,004
83 4,932,005
134 4,932,006
139 4,932,007
153 4,932,009
165 4,932,008

CLASS 368
80 4,932,010
185 4,932,011

CLASS 369
13 4,932,012
32 4,932,013
44.11 4,932,015
48 4,932,014
4,932,016
4,932,017
59 4,932,018
247 4,932,019

CLASS 370
14 4,932,020
54 4,932,021
60 4,932,022
85.15 4,932,025
85.4 4,932,023
85.9 4,932,024
94.1 4,932,026
112 4,932,027

CLASS 371
16.5 4,932,028
22.3 4,931,723
22.5 4,931,722
43 4,932,029

CLASS 372
26 4,930,901
32 4,932,030
41 4,932,031
45 4,932,032
46 4,932,033
96 4,932,034

CLASS 373
32 4,932,035

CLASS 374
150 4,930,902
170 4,930,222

CLASS 375
1 4,932,036
4,932,037
4 4,932,038
8 4,931,250
102 4,932,039
111 4,932,040
120 4,932,041

CLASS 376
128 4,931,251

CLASS 377
10 4,932,044
24.2 4,932,045

CLASS 379
32 4,932,046
53 4,932,047
60 4,932,049
67 4,932,042
4,932,048
157 4,932,043
211 4,932,050
399 4,932,051
430 4,932,052

CLASS 380
4 4,932,053
4,932,054
4,932,055
23 4,932,056
33 4,932,057

CLASS 381
13 4,932,058
22 4,932,059
24 4,932,060
30 4,932,061
43 4,932,062
73.1 B1 4,185,167

CLASS 382
8 4,932,064
9 4,932,065
56 4,932,066

CLASS 383
6 4,930,903
45 4,930,904
75 4,930,905
89 4,930,906

CLASS 384
45 4,932,067
118 4,930,907
276 4,930,910
480 4,930,908
492 4,930,909

CLASS 389
94 4,932,063

CLASS 400
28 4,930,911
48 4,930,912
120 4,930,913
122 4,930,914
175 4,930,915
636 4,930,916
690 4,930,917
719 4,930,918

CLASS 401
126 4,930,919
176 4,930,920
258 4,930,921
278 4,930,923
281 4,930,922

CLASS 402
30 4,930,925
55 4,930,926
63 4,930,927
79 4,930,928

CLASS 403
24 4,930,924

29 4,930,929
171 4,930,930
231 4,930,931
325 4,930,932
330 4,930,933

CLASS 404

75 4,930,935

CLASS 405

37 4,930,934
49 4,930,936
149 4,930,937
204 4,930,938
262 4,930,939
267 4,930,940

CLASS 406

10 4,930,941
49 4,930,942
90 4,930,943
97 4,930,944

CLASS 407

40 4,930,945

CLASS 408

80 4,930,946
153 4,930,947
190 4,930,948
222 4,930,949

CLASS 409

27 4,930,950
130 4,930,952
134 4,930,953
136 4,930,954
225 4,930,955
233 4,930,956
234 4,930,957

CLASS 411

14 4,930,951
44 4,930,963
107 4,930,959
188 4,930,960
266 4,930,961
366 4,930,962

CLASS 414

24.5 4,930,958
4,930,964
149 4,930,965
373 4,930,967
412 4,930,968
427 4,930,966
540 4,930,969
542 4,930,970
545 4,930,971
549 4,930,972
557 4,930,973
631 4,930,974
635 4,930,975
744.8 4,930,976
790.8 4,930,977

CLASS 415

58.3 4,930,978
58.4 4,930,979
115 4,930,980
119 4,930,981
121.2 4,930,982

CLASS 416

8 4,930,985
93 A 4,930,987
114 4,930,988
134 A 4,930,983
189 4,930,986
203 4,930,984
204 R 4,930,989
223 R 4,930,990

CLASS 417

18 4,930,991
20 4,930,992
226 4,930,993
286 4,930,994
312 4,930,995
373 4,930,996
410 4,930,997
462 4,930,998
534 4,931,000
552 4,930,999

CLASS 418

113 4,931,001

CLASS 419

23 4,931,252
25 4,931,253

CLASS 420

426 4,931,254
586 4,931,255

CLASS 422

65 4,931,256
100 4,931,257
124 4,931,258
143 4,931,259
147 4,931,260
292 4,931,261

CLASS 423

215.5 4,931,263
220 4,931,262
242 4,931,264
244 4,931,265
326 4,931,266
328 4,931,267
479 4,931,268
522 4,931,269

CLASS 424

1.1 4,931,270
47 4,931,271
49 4,931,272
52 4,931,273
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195.1 4,931,277
4,931,278
427 4,931,279
439 4,931,280
448 4,931,281
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449 4,931,283
450 4,931,284
473 4,931,285
480 4,931,286
484 4,931,287
486 4,931,288
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533 4,931,276
690 4,931,289
692 4,931,290

CLASS 425

28.1 4,931,004
66 4,931,003
83.1 4,931,005
412 4,931,006
438 4,931,007
456 4,931,008
549 4,931,009

CLASS 426

2 4,931,291
4,931,292
3 4,931,294
5 4,931,293
4,931,295
243 4,931,296
265 4,931,297
296 4,931,298
325 4,931,299
335 4,931,300
505 4,931,301
548 4,931,302
549 4,931,303
615 4,931,321
632 4,931,304
649 4,931,305

CLASS 427

37 4,931,306
38 4,931,307
39 4,931,308
48 4,931,309
53.1 4,931,323
55 4,931,310
56.1 4,931,311
64 4,931,312
140 4,931,314
164 4,931,313
167 4,931,315
227 4,931,316
385.5 4,931,317
397.7 4,931,318
421 4,931,319
4,931,322

CLASS 428

17 4,931,320
31 4,931,324
35.7 4,931,325
35.8 4,931,326
36.5 4,931,327
36.91 4,931,328
36.92 4,931,329
40 4,931,330
47 4,931,331
50 4,931,332
57 4,931,335
64 4,931,336
4,931,337
65 4,931,338
71 4,931,339
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100 4,931,344
116 4,931,345
137 4,931,334
182 4,931,346
192 4,931,347
207 4,931,348
209 4,931,354
282 4,931,010
283 4,931,355
4,931,356
284 4,931,357
285 4,931,358
288 B1 4,615,937
325 4,931,359
328 4,931,360
402.2 4,931,361
402.22 4,931,362
408 4,931,363
412 4,931,364
458 4,931,365
622 4,931,366

CLASS 429

50 4,931,367
53 4,931,368
98 4,931,369

CLASS 430

45 4,931,370
58 4,931,349
59 4,931,350
4,931,371
66 4,931,372
106 4,931,374
109 4,931,375
256 4,931,377
264 4,931,378
270 4,931,379
296 4,931,380
323 4,931,351
325 4,931,381
512 4,931,382
551 4,931,383

CLASS 431

3 4,931,011
9 4,931,012
10 4,931,013
126 4,931,014

CLASS 433

30 4,931,015
172 4,931,016

CLASS 434

87 4,931,017
234 4,931,018
409 4,931,019

CLASS 435

7 4,931,384
4,931,385
23 4,931,386
25 4,931,387
41 4,931,388
69.2 4,931,373
71.3 4,931,352
95 4,931,389
183 4,931,390
188 4,931,391
4,931,392
4,931,393
235 4,931,395
240.27 4,931,394
240.45 4,931,397
243 4,931,396
252.3 4,931,398
252.5 4,931,399
280 4,931,400
287 4,931,401
4,931,402
291

CLASS 436

65 4,931,403
128 4,931,404

CLASS 437

12 4,931,405
27 4,931,406
44 4,931,408
45 4,931,407
63 4,931,409
189 4,931,410
192 4,931,411
200 4,931,353
225 4,931,412

CLASS 439

72 4,931,020
285 4,931,021
310 4,931,022
459 4,931,023
856 4,931,024

CLASS 440

1 4,931,025
38 4,931,026
53 4,931,027

CLASS 446

225 4,931,028
396 4,931,029

CLASS 455

10 4,932,070
58 4,932,071
76 4,932,072
113 4,932,073
167 4,932,074
226 4,932,075

CLASS 474

237 4,931,030

CLASS 475

65 4,930,372
128 4,930,373

CLASS 493

195 4,931,033
203 4,931,034
216 4,931,035
355 4,931,031

CLASS 494

70 4,930,412

CLASS 501

31 4,931,413
103 4,931,414
133 4,931,415

CLASS 502

74 4,931,416
117 4,931,417
218 4,931,418
304 4,931,419
439 4,931,421

CLASS 503

205 4,931,420
214 4,931,422
227 4,931,423

CLASS 505

1 4,931,425
4,931,427
001 4,931,424
4,931,426

CLASS 512

25 4,931,428

CLASS 514

19 4,931,429
4,931,430
46 4,931,431
54 4,931,432
157 4,931,433
192 4,931,434
211 4,931,435
220 4,931,436
234.2 4,931,437
241 4,931,438
242 4,931,439
249 4,931,441
4,931,442
252 4,931,443
4,931,444
4,931,445
4,931,453
254 4,931,446
4,931,454
256 4,931,455
259 4,931,440
288 4,931,447
291 4,931,449
318 4,931,456
326 4,931,450
335 4,931,451
344 4,931,452
349 4,931,457
351 4,931,448
354 4,931,458
381 4,931,459
4,931,460
404 4,931,461
419 4,931,462
422 4,931,463
423 4,931,464
477 4,931,465
490 4,931,466
529 4,931,467
546 4,931,032
560 4,931,468
617 4,931,469
619 4,931,470
622 4,931,471
661 4,931,472
688 4,931,473
708 4,931,474
729 4,931,475

CLASS 521

34 4,931,476
58 4,931,477
73 4,931,478
76 4,931,479
99 4,931,480
123 4,931,481
131 4,931,482
137 4,931,483
143 4,931,484
154 4,931,485
159 4,931,486
163 4,931,487

CLASS 523

126 4,931,488
130 4,931,489
201 B1 4,391,928
218 4,931,490
443 4,931,491

CLASS 524

188 4,931,492
375 4,931,493
460 4,931,494
4,931,495
612 4,931,496

CLASS 525

42 4,931,497
54.1 4,931,498
60 4,931,500
61 4,931,501
64 4,931,502
67 4,931,503
68 4,931,504
123 4,931,505
187 4,931,506
193 4,931,507
194 4,931,499
4,931,508
208 4,931,509
302 4,931,510
326.3 4,931,511
333.3 4,931,512
474 4,931,513
504 4,931,515
531 4,931,514

CLASS 526

62 4,931,516
128 4,931,517
164 4,931,376
211 4,931,518
258 4,931,519
281 4,931,520
286 4,931,521
292.2 4,931,522
292.3 4,931,523
305 4,931,525
336 4,931,526

CLASS 527

301 4,931,524
400 4,931,527

CLASS 528

94 4,931,528
4,931,529
4,931,530
125 4,931,531
172 4,931,532
185 4,931,533
4,931,534
193 4,931,535
230 4,931,536
250 4,931,537
4,931,538
292 4,931,539
353 4,931,540
4,931,541
370 4,931,542
373 4,931,545
422

CLASS 530

351 4,931,543
4,931,544
4,931,546
356 4,931,547
387 4,931,548
399

CLASS 534

557 4,931,549
724 4,931,550

CLASS 536

20 4,931,551
119 4,931,552
121 4,931,553
124 4,931,554

CLASS 540

222 4,931,555
364 4,931,556
4,931,557

CLASS 544

124 4,931,558
276 4,931,559
315 4,931,560
336 4,931,561
463 B1 4,398,029

CLASS 546

19 4,931,562
222 4,931,563
286 4,931,564

CLASS 548

363 4,931,565
453 4,931,566
455 4,931,567

CLASS 549

6 4,931,568
62 4,931,570
221 4,931,569
230 4,931,571
239 4,931,572
325 4,931,573
405 4,931,574
453 4,931,575
514 4,931,576

CLASS 556

123 4,931,577
470 4,931,578

CLASS 558

29 4,931,579

CLASS 560

13 4,931,580
18 4,931,581
172 4,931,582
180 4,931,583
190 4,931,584

CLASS 562

17 4,931,585
24 4,931,586
68 4,931,588
401 4,931,587
490 4,931,589
590 4,931,590

CLASS 564

165 4,931,591
267 4,931,592
296 4,931,593
393 4,931,595
477 4,931,596

CLASS 568

727 4,931,594

CLASS 600

18 4,931,036

CLASS 604

8 4,931,037
20 4,931,046
22 4,931,038
4,931,047
53 4,931,039
110 4,931,040
4,931,048
155 4,931,041
164 4,931,042
165 4,931,049
228 4,931,043
248 4,931,044
338 4,931,045
361 4,931,051
385.1 4,931,052
891.1 4,931,050

CLASS 606

2 4,931,053
43 4,931,054
60 4,931,055
130 4,931,056
150 4,930,502
153 4,931,057
158 4,931,058
185 4,931,059
188 4,931,060

CLASS 723

41.49 4,930,460

D2—	314	308,280			308,305		341	308,331		315	308,357			308,384		209	308,410
	316	308,281			308,306		367	308,332		317	308,358	D15—	7	308,385		229	308,411
		308,282		439	308,307		376	308,333	D14—	100	308,360		127	308,386		241	308,412
		308,283		444	308,308		395	308,334		109	308,361		130	308,387		356	308,413
		308,284		465	308,309		396	308,335		113	308,362	D16—	133	308,388		359	308,414
	320	308,285		502	308,310		402	308,336			308,363		242	308,389		366	308,415
		308,286		601	308,311		404	308,337		114	308,364	D17—	22	308,390		370	308,416
	639	308,287	D7—	322	308,313		415	308,338		126	308,365	D18—	7	308,391		383	308,417
D3—	12	308,288			308,314		424	308,339			308,366		38	308,392		395	308,418
		308,289			308,315		425	308,340			308,367		41	308,393		411	308,419
	38	308,290		351	308,316		433	308,341			308,368	D19—	34.1	308,394	D24—	17	308,420
	56	308,291		409	308,317	D10—	22	308,342			308,369		42	308,395	D25—	124	308,421
	61	308,292		523	308,318		54	308,343			308,370		49	308,396	D26—	35	308,422
		308,293		605	308,319		92	308,344			308,371	D20—	28	308,397		67	308,423
		308,294		627	308,320			308,345			308,372		31	308,398		107	308,424
		308,295		676	308,312		94	308,346			308,373		35	308,399	D28—	41	308,425
	62	308,296	D8—	33	308,321		106	308,347			308,374	D21—	146	308,400			308,426
		308,297		40	308,322	D11—	43	308,348			308,375		149	308,401		46	308,427
	76	308,298		49	308,323		75	308,349			308,376		237	308,402		76	308,428
	123	308,359		50	308,324		132	308,350			308,377			308,403			
D6—	328	308,299		62	308,325	D12—	13	308,351		133	308,378		240	308,404	D30—	109	308,429
	372	308,300		70	308,326		155	308,352		163	308,379	D22—	134	308,405	D32—	35	308,430
		308,301		105	308,327		162	308,353		218	308,380		140	308,406		37	308,431
		308,304		356	308,328		185	308,354		245	308,381	D23—	205	308,407			308,432
	379	308,302	D9—	300	308,329		191	308,355		258	308,382		208	308,408		49	308,433
		308,303		338	308,330		203	308,356			308,383			308,409	D34—	25	308,434

CLASSIFICATION OF PLANTS

P.—	51	7,240		68	7,241		70	7,242		74	7,243						

STATUTORY INVENTION REGISTRATIONS

55—	97	H785	156—	634	H788	350—	620	H783	430—	372	H789						
149—	36	H787	342—	17	H792	422—	56	H791	525—	314	H790	528—	4	H786		241	H784

GEOGRAPHICAL INDEX

OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)

Alabama	1	Kentucky	21	Oregon	41
Alaska	2	Louisiana	22	Pennsylvania	42
American Samoa	3	Maine	23	Puerto Rico	43
Arizona	4	Maryland	24	Rhode Island	44
Arkansas	5	Massachusetts	25	South Carolina	45
California	6	Michigan	26	South Dakota	46
Canal Zone	7	Minnesota	27	Tennessee	47
Colorado	8	Mississippi	28	Texas	48
Connecticut	9	Missouri	29	Utah	49
Delaware	10	Montana	30	Vermont	50
District of Columbia	11	Nebraska	31	Virginia	51
Florida	12	Nevada	32	Virgin Islands	52
Georgia	13	New Hampshire	33	Washington	53
Guam	14	New Jersey	34	West Virginia	54
Hawaii	15	New Mexico	35	Wisconsin	55
Idaho	16	New York	36	Wyoming	56
Illinois	17	North Carolina	37	U.S. Air Force	57
Indiana	18	North Dakota	38	U.S. Army	58
Iowa	19	Ohio	39	U.S. Navy	59
Kansas	20	Oklahoma	40		

(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

PATENTS

01 : 4,930,463
4,930,644
02 : 4,930,535
04 : 4,930,244
4,930,309
4,930,357
4,930,525
4,930,725
4,930,785
4,930,834
4,930,842
4,930,928
4,930,934
4,931,014
4,931,300
4,931,432
4,931,630
4,931,717
4,931,729
4,931,780
4,931,801
4,931,904
05 : 4,930,188
4,930,657
4,930,965
4,931,964
06 : Re.33,228
4,930,172
4,930,177
4,930,220
4,930,236
4,930,249
4,930,263
4,930,269
4,930,276
4,930,281
4,930,306
4,930,314
4,930,351
4,930,360
4,930,362
4,930,388
4,930,390
4,930,392
4,930,393
4,930,418
4,930,445
4,930,448
4,930,452
4,930,454
4,930,466
4,930,495
4,930,513
4,930,515
4,930,520
4,930,535
4,930,563
4,930,586
4,930,626
4,930,632
4,930,660
4,930,662
4,930,684
4,930,692
4,930,733
4,930,734
4,930,737
4,930,745
4,930,746
4,930,749
4,930,762
4,930,770
4,930,774
4,930,794
4,930,832
4,930,843
4,930,854
4,930,855
4,930,866
4,930,884
4,930,887
4,930,893
4,930,894
4,930,906
4,930,907
4,930,911
4,930,961
4,930,973
4,930,987
4,930,997
4,931,039
4,931,040
4,931,048
4,931,049
4,931,051
4,931,058
4,931,061
4,931,067
4,931,079
4,931,080
4,931,086
4,931,113
4,931,115
4,931,116
4,931,122
4,931,158
4,931,161
4,931,207
4,931,228
4,931,235
4,931,256
4,931,266
4,931,285
4,931,328
4,931,333
4,931,335
4,931,361
4,931,408
4,931,424
4,931,431
4,931,448
4,931,451
4,931,452
4,931,493
4,931,501
4,931,543
4,931,544
4,931,552
4,931,580
4,931,608
4,931,645
4,931,665
4,931,671
4,931,672
4,931,673
4,931,694
4,931,695
4,931,715
4,931,731
4,931,738
4,931,739
4,931,747
4,931,751
4,931,752
4,931,753
4,931,759
4,931,763
4,931,775
4,931,778
4,931,783
4,931,789
4,931,795
4,931,799
4,931,809
4,931,813
4,931,844
4,931,852
4,931,854
4,931,865
4,931,871
4,931,892
4,931,907
4,931,917
4,931,923
4,931,942
4,931,946
4,931,952
4,931,973
4,931,974
4,931,979
4,931,986
4,931,990
4,932,004
4,932,022
4,932,028
4,932,039
4,932,046
4,932,047
4,932,049
4,932,052
4,932,055
4,932,075
4,557,774
08 : 4,930,163
4,930,493
4,930,575
4,930,602
4,930,621
4,930,695
4,930,731
4,930,835
4,930,929
4,930,981
4,931,786
4,931,808
09 : 4,930,227
4,930,381
4,930,441
4,930,553
4,930,604
4,930,622
4,930,669
4,930,764
4,930,922
4,931,024
4,931,037
4,931,148
4,931,152
4,931,204
4,931,356
4,931,366
4,931,473
4,931,603
4,931,611
4,931,712
4,931,750
4,931,900
4,931,932
4,932,044
4,932,054
10 : 4,930,639
4,931,172
4,931,178
4,931,286
4,931,484
4,931,551
12 : Re.33,229
4,930,180
4,930,183
4,930,219
4,930,253
4,930,327
4,930,399
4,930,485
4,930,503
4,930,562
4,930,636
4,930,640
4,930,647
4,930,679
4,930,711
4,930,726
4,930,727
4,930,750
4,930,753
4,930,754
4,930,771
4,930,779
4,930,815
4,930,838
4,930,886
4,930,948
4,930,951
4,930,980
4,931,059
4,931,330
4,931,662
4,931,700
4,931,765
4,931,793
4,931,890
4,931,894
4,931,895
4,931,920
4,931,948
4,931,989
4,932,057
4,932,070
13 : 4,930,161
4,930,228
4,930,267
4,930,333
4,930,555
4,930,598
4,930,625
4,930,650
4,930,655
4,930,666
4,930,706
4,930,751
4,931,023
4,931,151
4,931,355
4,931,839
15 : 4,930,178
16 : 4,930,189
4,930,501
4,931,026
4,931,303
4,931,911
17 : 4,930,171
4,930,176
4,930,234
4,930,235
4,930,257
4,930,279
4,930,312
4,930,324
4,930,336
4,930,356
4,930,366
4,930,403
4,930,431
4,930,455
4,930,509
4,930,521
4,930,548
4,930,590
4,930,600
4,930,601
4,930,611
4,930,653
4,930,659
4,930,667
4,930,730
4,930,741
4,930,744
4,930,756

4,930,767
4,930,775
4,930,781
4,930,801
4,930,831
4,930,885
4,930,900
4,930,970
4,931,003
4,931,035
4,931,165
4,931,224
4,931,246
4,931,294
4,931,295
4,931,318
4,931,404
4,931,429
4,931,446
4,931,508
4,931,604
4,931,627
4,931,710
4,931,774
4,931,805
4,931,806
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51 :	4,930,201		4,931,792		4,931,111	55 :	4,930,204		4,930,790		
	4,930,322		4,932,036		4,931,119		4,930,280		4,930,914	56 :	4,930,797

DESIGN PATENTS

01 :	308,364	08 :	308,298	25 :	308,285	34 :	308,297		308,360	42 :	308,320
04 :	308,353	09 :	308,343		308,286		308,323		308,389		308,322
06 :	308,295		308,415	26 :	308,293		308,408		308,390		308,416
	308,305	12 :	308,287		308,328		308,409		308,397	44 :	308,324
	308,321		308,410		308,382		308,428		308,412	45 :	308,359
	308,326	16 :	308,354		308,383		308,431		308,420	47 :	308,310
	308,327	17 :	308,317		308,384		308,432	37 :	308,299		308,398
	308,334		308,331		308,417		308,434		308,307	48 :	308,291
	308,338		308,348	27 :	308,281	36 :	308,294		308,308		308,325
	308,355		308,394		308,282		308,309	39 :	308,288		308,335
	308,399	18 :	308,405		308,283		308,313		308,289		308,404
	308,401	20 :	308,351		308,284		308,314		308,337		308,429
	308,403		308,385		308,311		308,315	40 :	308,350	50 :	308,433
	308,411		308,406	29 :	308,290		308,333		308,356	53 :	308,381
	308,419		308,421		308,388		308,336	41 :	308,280	55 :	308,386
	308,422	24 :	308,312	33 :	308,358						

PLANT PATENTS

06 :	7,243	39 :	7,241	40 :	7,240						

STATUTORY INVENTION REGISTRATIONS

12 :	H783		H786								
24 :	H784		H787	36 :	H788		H792	48 :	H785		H790

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